Amateur Radio

Journal of the Wireless Institute of Australia

IN THIS ISSUE:

* Part 2 of VK5RG's series - *Some Useful Wire Antennas for HF*

* VK5BR explores the *Output Balance of the Z Match*

* VK3KRO asks, *Is Your Mobile Gear Insured?*

Plus

lots of amateur radio news, information, articles and special interest columns.

16-Page Supplement Inside
"Exposure Draft"
Submission to Parliament on
Amateur Licensing

Amateur Radio

Institute of Australia, ACN 004 920 745 as its
Official Journal, on the last Friday of each month.

PUBLICATIONS COMMITTEE

Journal of the Wireless Institute of Australia

Vol 64 No 4   ISSN 0002-6859   April 1996

CONTENTS

Cover

This magnificent trophy, the Frank Hine Memorial Trophy for the VK/ZL/Oceania
DX Contest CW Section, was donated to the WIA by Susan Hine, the daughter
of the late Frank Hine VK2QL (see the article on page 25). The trophy features
the original Morse key used by Frank Hine when he first became an amateur radio
operator in 1935.

Wireless Institute of Australia

Editor's Comment

More Survey Results

As mentioned in the February *Editor's Comment*, the closing date for survey responses was extended to 28 February. This has brought in a good number of additional entries; in fact, almost doubling the total to about 8% of membership.

In addition to the preliminary figures given in the March *Editor's Comment* on the topics which you would like to see increased or reduced, we now have a larger and more statistically significant sample. But there has been very little change in the percentages, so the original 4% sample was probably large enough to be quite valid.

More difficult to assess is the range of viewpoints covered by the "write- in" questions 8 and 9. It was very interesting to see how wide a span of opinions was revealed. For example, a few saw little merit in *Over to You* and thought it should be scrapped! Almost as many valued it so much that they thought it should be expanded to occupy all non-technical space!

Perhaps, when I referred in March to the probability of many younger amateurs being on the Internet, it was partly a joke. I had not, at that stage, seen the detailed figures but, of those who want more topics covered by *Amateur Radio*, a large proportion want columns on computers and digital technology and interfacing to amateur systems.

We have only two problems as regards a computer column. To make space we will have to reduce something else (difficult, but not impossible), and we need a competent person to write it. Do we have any volunteers? There may be merit in expanding the *Packet World* segment to include other computer applications, but its author, Grant Willis VK5ZWI, would need to become a team!

Many members used their survey form to complain about late delivery of the February issue. This was completely out of our control, and the reason was explained on page 26 of the March issue of *Amateur Radio*. We hope such a mailing delay is never repeated.

Another frequent comment was on the size of type in *Amateur Radio*. A number would like it to be larger; but some also wanted it smaller! With this issue we are changing to a different style of typeface, hopefully more readable, as suggested by its use in the vast majority of newspapers.

There are many other suggestions which have been made. In most cases they show a praiseworthy depth of interest in the future of amateur radio and this magazine. Over the next few months we will be considering them in detail. But, to conclude this month's brief review, we have been flattered by the number of readers who want no change to the magazine; something like 35% of respondents are happy with *Amateur Radio* "as-is". We must be doing some things the right way!

Survey Winner

By a process of random selection of survey responses, the lucky winner of a year's free WIA subscription is Bob Gebhardt VK5RI. Congratulations Bob!

Bill Rice VK3ABP — Editor

■ WIA News

Roger Harrison VK2ZRH, Federal Media Liaison Officer

Submission on Licensing Circulated to Parliamentarians and Election Candidates

During the week before the 2 March federal election, the Federal WIA released an "Exposure Draft" of the Submission to the Parliament on Amateur Radio Licensing. Copies of the 40-page document were circulated to candidates standing for the federal election for the House of Representatives and half the Senate. Copies were also sent to sitting members of the Senate. In all, some 500 copies were distributed.

All WIA Divisions and Federal Councillors were sent copies of the Submission.

The Exposure Draft is published as a 16-page supplement in this issue.

When the new Government's ministry was announced in early March, the WIA wrote a follow-up letter to the new Minister for Communications and the Arts, Senator Richard Alston.

The initial objective of the Exposure Draft is to gain exposure for our cause. This Exposure Draft is **NOT** the final Submission; that will come later and is expected to include considerably more detail evidencing the value of amateur radio to the community. In the final event, the WIA will be dealing with the 38th Parliament on this issue, negotiating for the benefit of all Australian radio amateurs. In order to successfully pass through the committee systems of the Lower House and the Senate, we need to gain the interest and support, not only of the Government, but the Opposition and minority party members of Parliament.

The Submission has necessarily taken time to develop, needing research into what the WIA had previously thought and advocated in earlier submissions to Government and the regulators. It required research into what issues Parliamentarians were sensitive to, and which amateur radio activities to promote particularly.

The legislative actions of the Parliament and the policies of the major parties have been drawn upon to support the Submission's line of argument, which should certainly resonate with Parliamentarians.

It could never have been expected that a hastily devised submission of a few short pages, relying on irrelevant history and emotive argument would achieve much, other than parliamentary scorn. Simply demanding a change to administrative arrangements from the Government last year was considered to expose the Amateur Radio Service to further administrative changes in years to come under a different Government or administration; it was felt that a more permanent change was called for, or else amateurs would be battling further unwarranted fee rises in years to come. For these reasons, the Submission proposes changes to the Radiocommunications Act to effect a more permanent status for the licensing of the Amateur Radio Service and to separate it from the policy of price-based access to spectrum which contributed to the proposed huge rise in fees 15 months ago, to which the amateur radio fraternity objected.

It is expected that the Exposure Draft of the Submission will flush out opposition to the arguments and proposals. This will allow the Institute to see where the opposition arises and provide a chance to counter it effectively in a second draft. The publication and circulation of the Exposure Draft will also allow time for further discussion within the amateur radio fraternity, time for the Institute to advocate the objectives of the proposals and refine the details and supporting material in response to feedback. It will also provide time to search out allies to our cause within the radiocommunications community, and perhaps elsewhere.

Following this process, a final Submission will be drafted. This process parallels the Parliamentary process in developing policy and legislation, and will thus be seen by Parliamentarians as legitimising the Submission.

Submission Summary

The goals of the Submission are threefold:

1. to achieve formal recognition by the Parliament that the Amateur Radio Service is of value to the Australian community in a variety of ways;
2. that there is a better way for the administration to license radio amateurs;
3. that there is consequently a way in which licence fees can be greatly reduced.

The Submission presents a detailed picture of the different ways in which the Amateur Radio Service is of value to the community. Six key areas are highlighted:

1. education and self-training;
2. motivating young people to take up scientific or technological careers;
3. contribution to the advancement of scientific knowledge;
4. contribution to the development of technology;
5. providing communications during emergencies; and
6. supporting community events.

Issues raised in key public service and Government research reports, papers and statements are related to the evidence presented in the Submission, showing how the Amateur Radio Service impinges on the issues of concern, and contributes value to the community.

The Submission details the current three licensing systems:

Apparatus Licensing -- under which radio amateurs are licensed; Class Licensing; and Spectrum Licensing; and shows why none of these three systems suits the Amateur Radio Service.

Apparatus Licensing is a poor licensing model for amateur radio because it is prescriptive, focusing on equipment, its location, and uses. The licence fee policy for Apparatus Licensing puts a value on the "scarcity" of, and "demand" for, spectrum and acts as a "rationing" device -- all economic concepts entirely unsuited to the Amateur Radio Service, which is, by definition, non-commercial.

The Apparatus Licence fee framework has been severely distorted to arrive at the current amateur licence fee, making a mockery of the policy.

Class Licensing is for equipment of specified kinds and/or for a specified purpose, and Class Licences are not issued to individual users. The Submission argues that this is of no use to radio amateurs.

Spectrum Licensing also has limitations for the Amateur Radio Service. Firstly, it has a clear commercial purpose, as it is policy that Spectrum Licences will be allocated by a price-based allocation system. That is, spectrum will be auctioned. In any case, Spectrum Licences have a 10-year tenure, and there's no automatic right of renewal. This, also, is of no use to radio amateurs.

In the light of all this, the WIA Submission *proposes* that the 38th Parliament establish a new licensing category under the Radiocommunications Act, to be known as the **Amateur Operator** Licence.

The present seven licence sub-types would remain. That is: Unrestricted, Limited, Intermediate, Novice, Novice Limited, Beacon and Repeater.

Further, the Submission proposes that **no spectrum tax** be levied, in recognition of the value of amateur radio to the community. The nett cost of this to the Government would be just $200,000. The present $3 Spectrum Management charge would be retained.

The Submission proposes that administrative charges could be reduced through reduction in the administrative

contact between radio amateurs and the SMA. It is pointed out that the administrative charge proposed in 1994 was $25, which rose to $38 when the $51 licence fee was introduced in March 1995. This rise has never been explained.

Administrative charges could be reduced, firstly, by having a licence term of five years, which is already allowed under the Act.

Secondly, it is proposed to separate the *issue* of a licence and the *allocation* of a call sign. Call sign administration is proposed to be devolved to the WIA. Call signs don't need to be "renewed" in the same way the licence needs to be renewed. Annual renewal would be unnecessary. Most amateurs keep a call sign for an average of ten years anyway, according to the SMA. Those amateurs who upgrade their licence change their call sign more frequently. The WIA would provide licensees' call signs to the SMA for their database in a block, say every quarter, which would reduce the SMA's administrative expenses.

The present routine for obtaining a licence would be retained. Candidates would still obtain the relevant qualification for a Certificate of

Proficiency through the present amateur examination system, which was devolved to the WIA in 1992. In future, it is envisaged that issuing of Certificates of Proficiency might also be devolved to the WIA.

When the time comes to formally approach the Government with the final submission, our position will be much stronger because we will be able to claim rightfully that the submission has been developed from debate within the amateur radio fraternity.

We have a long way to go, but the first big step has been made.

Call for Comment

Constructive commentary on the Exposure Draft is encouraged. It should be addressed to your Division Federal Councillor. Questions on any aspect of the Exposure Draft should also be addressed through your Federal Councillor.

Anyone with further information, or suggestions on sources for information, which may be relevant to the Submission, should contact the Federal Media Liaison Officer, Roger Harrison VK2ZRH, LMB 888, Woollahra NSW 2025.

Misleading Information on Submission Deadline

Letters from former Labor Government members, sent earlier this year to radio amateurs who'd enquired about Amateur Licence fees, contained an erroneous statement about the WIA allegedly agreeing to make a submission on Amateur Licence fees before the end of the 1995 financial year, that is, June.

No such commitment about the submission was made. In fact, the WIA was told by the Labor Government that the time frame to make a submission was "open ended."

The letters from Labor Government members referred to the March 1995 meeting between the WIA and the Government, saying: "... *the Government made a commitment to further*

review the licensing and fee structure for amateur radio operators as soon as possible. It invited the WIA to make a detailed submission on the issues affecting amateurs which the WIA agreed it would make before the end of the financial year."

The March 1995 meeting was with the Parliamentary Secretary to the Minister for Communications, Paul Elliott, during which the Institute was invited to make a "detailed submission" on how the Amateur Radio Service could be better licensed. In discussions with Paul Elliott's senior adviser subsequent to that meeting, the WIA outlined the difficulty in setting a short

time deadline for a "detailed submission" to be put to the Government. It was pointed out that a great deal of research would necessarily have to be put into it, evidence obtained from a wide variety of sources and a process of consultation among the seven WIA Divisions gone through. Mr Elliott's adviser generously suggested an open-ended time frame. This fact was subsequently reported in *Amateur Radio*.

As has also been published in *Amateur Radio* magazine, they said what the Government wanted was a detailed, well-argued submission and not just a further plea for reduced fees, the arguments for which were already well known. A framework for the submission was circulated and agreed by the WIA Federal Council in June last year, read out on Divisional broadcasts and published on the packet radio network, with input invited from the radio amateur community. A request for further, specific, information was circulated to Divisions in January and published on the packet radio network. The Institute has not been idle.

In a discussion between the WIA and the Minister for Communications Michael Lee's office on Thursday, 29 February 1996, the Minister's senior adviser said they were unaware that the invitation to put the submission was open-ended, and agreed that any future letters to amateurs would not mention the erroneous WIA 'commitment' to the ". . . end of the financial year" submission deadline.

As there was a change of Government on 2 March, and a new Minister for Communications and the Arts announced later (Senator Richard Alston), the WIA will be dealing in future with the new Minister.

Hang Glider Enthusiasts Moved from 2 m Amateur Band

Hang glider enthusiasts participating in a championship contest near Bright, in north-east Victoria, earlier this year were found to be using 2 m amateur transceivers for communications.

On being notified of this operation, the Spectrum Management Agency approached the contest organisers. It turns out that a few contestants from overseas were actually licensed amateurs and had obtained reciprocal licences. It seems local contestants used CB equipment, but some overseas contestants were using 2 m amateur equipment and did not have licences.

The SMA put an immediate stop to the unlicensed operations on the 2 m band and approached the Victorian Division of the WIA, asking if unlicensed contestants could be permitted to operate on a once-off, temporary basis.

Victorian President, Jim Linton,

VK3PC, refused as the 2 m band is one of very few exclusive amateur allocations above 30 MHz, unlicensed operation could not be condoned under the circumstances, and the Division was aware of some ill-tempered threats from local Victorian amateurs to jam the unlicensed operators that could present a safety-of-life threat, which nobody wanted.

The hang gliding contest was held up for a day while the SMA arranged licences for operation outside the 2 m band, charging each of the contestants a substantial fee for the temporary Apparatus Licence. The contest organisers were advised to make it a condition of entry in future that contestants must prove they have a licence for all radio equipment, which is the case with car rallies, for example.

ar

■ Antennas

Some Useful Wire Antennas for HF
Part 2

Rob S Gurr VK5RG* continues sharing his knowledge of wire antennas with us.

G5RV

This antenna is one of the most popular in use on HF. It first came to amateur attention in 1935, being a design for a multi-directional radiator for 14 MHz. In the late 1940s, G5RV promoted its use as a multiband antenna, fed with a matching stub, and a 75 ohm coaxial cable. The antenna on 14 MHz is 1½ wavelengths long and, with six useful lobes, was much better than a dipole (Fig 9). It followed that the SWR was low on 14 MHz, and on some other bands popular at the time, and its use as a universal antenna grew, particularly as any mismatch on these bands could be taken up by the pi network output stages in the valve transmitters in use in those days.

On 3.5 MHz it became a shortened dipole, and on 7 MHz the bi-directional characteristics of a full size dipole were evident. However, with the introduction of solid state equipment with a fixed 50 ohm output impedance, it became necessary to use an antenna coupler with the antenna, and subsequently the later articles show the antenna in the open wire configuration. The directional properties on the various bands were accepted without question, but many experimenters testing the antenna found not as good as a previously used dipole. This is common with a lot of short period tests of long wire antennas, where the stations being contacted are located in a deep "null" (Fig 9) giving poor results. However, a station on a bearing only a few degrees away, may be of good strength (this aspect of all antennas must be kept in mind when conducting such tests).

The antenna dimensions are 15.54 m each side of centre, and the matching section of open wire line is 10.36 m; however, any length of line should be suitable, if correctly matched with an ATU.

Terminated Vee Beam

Long wire antennas exhibit considerable gain, at little expense (compared to some commercial antennas) (see Fig 12). Regrettably, the gain in some cases is spread over four major "lobes" as well as some smaller lobes. Apart from having gain, there are, unfortunately, directions in between the main lobes where there is very little radiation, or "nulls". This latter property, mentioned before, explains why sometimes an unsuspecting amateur may build a long wire antenna and find it is ineffective, the only stations on the air during his trials probably being in the direction of these "nulls".

The angles of major radiation and the "nulls" can be determined from prepared charts, and a combination of "long wires" made to amalgamate these lobes into a useful directional "beam". Two popular antennas are the "Vee Beam", and the "Rhombic" which, in their standard form, are bidirectional, but when "terminated" become unidirectional in the direction of the termination.

The rhombic is a little large for suburban backyards, but where space is available, it is a high grade antenna. The
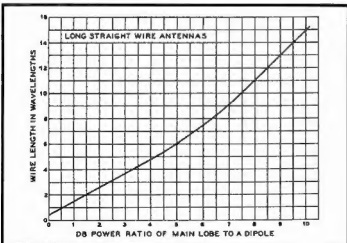
Figure 12 – Directive gain of long wire antenna.
(Reprinted from the Radio Handbook, twenty-first edition, page 28-3)
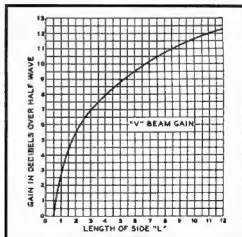
Figure 13 – Directive gain of a V beam.
(Reprinted from the Radio Handbook, twenty-first edition, page 28-5)
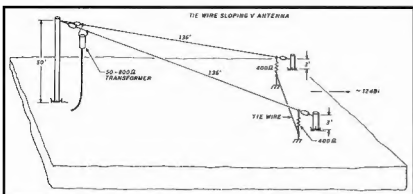
Figure 14 – Terminate V beam antenna.
(Reprinted from Ham Radio, May 1990, page 49)
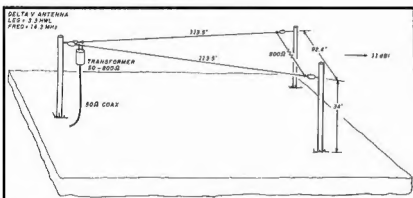
Figure 15 – Delta V antenna optimised for the 20 metre band.
(Reprinted from Ham Radio, May 1990, page 52)

"Vee" beam also requires a large area. However, in case a suitable space is available or there are some friendly neighbours, I will describe a terminated "Vee Beam" with special features.

The Beam

The lobes of two long wires may be combined into forming a Vee Beam, with gain, as shown in Fig 13. The resultant bi-directional pattern may be made unidirectional by terminating each distant end with a 400 ohm resistor to ground, with a benefit of up to 3 dB additional gain (Fig 14). The height of the apex of the "Vee" should be at least 10 metres, whilst that at the ends need only be adequate to clear pedestrians, and animals if on a farm paddock.

The slope of the wires gives further enhancement to the unidirectional properties. When the terminating resistors are returned to ground, the suitability of the ground conductivity is often suspect, to the extent some

constructors put in a ground wire immediately below the antenna wires. A now popular method of avoiding this ground return problem is to connect the two wires together, across the base of the Vee, and connect them together with a termination resistor of double the value (ie 800 ohms).

Fig 15 shows the dimensions pictorially, and a chart showing potential gain is shown in Fig 16. As is evident, there is every reason to expect good results from such an antenna.

The W8JK Antenna

First published in the late 1930s, an article on end-fire antenna arrays, by Dr John Kraus in the USA, presented to the engineering world an interesting multiband gain antenna, suitable for use by amateur and professional alike.

This is an end-fire array in which its elements are driven, compared to the Yagi which utilises parasitic elements. The driven elements can also be collinear elements, making a combination end-fire and collinear array (Fig 17). There are a number of useful features which make it attractive as a multipurpose, multiband antenna, including:

1. not as seriously influenced by height above ground as a similar sized Yagi array;
2. useful as a multiband antenna;
3. symmetrical in its construction;
4. adjustments made at the base of the feedline, not at the antenna;
5. has reasonable gain; and
6. is bi-directional.

My own experience has revealed the W8JK to be a good choice for a fixed wire antenna for any location. I have
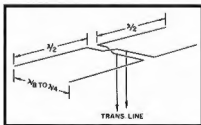
Figure 17 – A four-element array combining collinear broadside elements and parallel end-fire elements, popularly known as the W8JK array.
(Reprinted from The ARRL Antenna Book 15th Edition, page 8-37)

"Magic" leg lengths in half waves for delta and V antennas. (Other delta dimensions are not recommended.)

Leg length (half wavelength)	Delta Gain (dBi)	V Gain (dBi)	Comments
1.7	9.3	9.4	Compact antennas
2.1	9.9	9.9	Compact antennas
3.3	12.4	11.0	Best delta tradeoff
6.0	12.0	12.8	
7.5	12.8	13.6	
8.7	12.9	13.5	
10.0	13.1	14.9	Highest gain size

Figure 16 – Table 2.
(Reprinted from Ham Radio, May 1990, page 51)
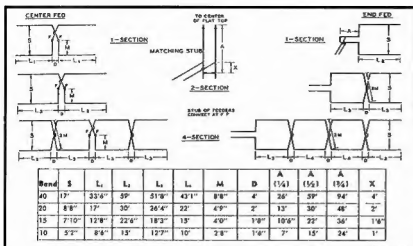
Figure 18 – W8JK array design data.
(Reprinted from the Radio Handbook, twenty-first edition, page 20-16)
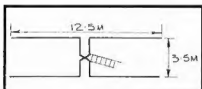
Figure 19 – A W8JK array for 10 MHz as a gain antenna, useful on various bands as follows:
10 MHz – single section W8JK with gain of 3 dB over dipole.
14 & 18 MHz – extended halfwaves for driven dipoles, for 4 dB gain.
21 MHz – driven elements equal to two halfwaves in phase, for 5 dB gain.
24 & 28 MHz – driven elements equal to two extended halfwaves in phase, for 6 dB gain.
(Reprinted from Amateur Radio, September 1984, page 17)

also used it as a rotary beam antenna and, as such, it only requires 180 degree rotation for all-round coverage.

A number of configurations using single, and double sections are possible (Fig 18). Stacking is also possible, for which an appropriate gain increase (max 3 dB) may be realised. The most successful simple version for suburban backyard use would be the single section array. With 10 metre half wave elements, and 2.5 m spacing, this combination gives 3, 4 and 5 dBd gain on 14, 21 and 28 MHz respectively (Fig 19). One other version uses two half-waves in phase, each driven, for gains of 5 dBd and 6 dBd on 14 and 21 MHz. On 28 MHz the lobes break up and, whilst having useful gain, are multi-directional.

Yet another arrangement has two

extended half-waves in phase to give 6 dBd gain on 14 MHz. The lobes on 21 MHz and 28 MHz, whilst useful and possessing high gain, are in odd positions and orientation of the antenna for directional use on 14 MHz only seems the most practical. It is not imperative that all elements are exactly a half wave, as long as they are equal in length and the whole configuration is symmetrical (Fig 20).

One major advantage is the ability of the array to operate over a 2.5 to 1 frequency range and maintain the bidirectional pattern, with gain increasing as the frequency is raised. Most designs show a spacing of 1/8 wavelength, but anything between this and 1/4 wave should give good results. The array may be erected less than a halfwave above ground, provided that the symmetry of the W8JK array is maintained (ie it is sufficiently far away from nearby structures, trees, etc). It gives good results on every band from 10 to 28 MHz (as well as good reception on the various broadcast bands).

ZL Special Antenna

This antenna is another version of the two element end-fire phased array (W8JK), but configured to give unidirectional radiation. The ZL Special is a popular antenna in its own right, and is used mainly on 14 MHz and above as a directional beam, with 4 to 5 dBd gain and a front-to-back ratio that is greater than 30 dB. It is also used on VHF and UHF as the major driven element in a multi-element long-boom Yagi (Fig 21).

It evolved from early experiments using two dipoles, spaced 1/8 wave, and

Figure 20 – E-plane pattern for the W8JK array. The elements are parallel to the 90° – 270° line in this diagram. Less than 1° change in half-power beamwidth results when the spacing is changed from 1/8 to 1/4 of a wavelength.
(Reprinted from The ARRL Antenna Book 15th Edition, page 8-37)
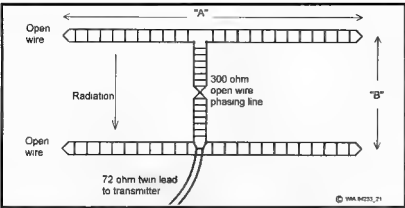
Figure 21 - The ZL-Special antenna has good gain and directional characteristics considering its overall size. For example, dimensions for 14.1 MHz are A = 31'6" and B = 8'6".

fed 135 degrees out of phase. This array (G8PO) used each dipole fed with an equal length of twin feed line, one line being transposed and fed in parallel with the other (180 degrees). A further phase shift was provided by an additional quarter wave length in one of the feedlines (45 degrees). This method of phasing can produce a number of interesting patterns, depending on the spacing and phase shift between two elements (Fig 22).

The ZL Special uses a phasing line connected directly between the elements at the top of the mast (so therefore has to be pre-cut to length), and only one feed line. The centre impedance is very low, being about 12.5 ohms. Matching stubs enable it to be driven by open wire lines or coaxial cable.

A similar antenna developed by HB9CV, and published in the European press, uses a coaxial cable phasing line between the two elements, which are gamma matched to the diametrically opposite quadrants. This version has become very popular for VHF use as a

fox hunting antenna, where its front to back ratio is extremely useful.

Construction

The use of "plumber's delight" methods is precluded in the ZL Special by the need for an insulator in the centre of each element. The boom may be 50 to 70 mm aluminium tube. "U" bolted on to the vertical drive pipe. If, say, a 10 metre length of 32 mm diameter aluminium tubing (with appropriate tapering) is used for the elements, and split in the middle, cambric or fibre glass rod may be used for joiners, inserted into the central tube ends, to give an insulated "split" in the elements. This need only be 150 mm long, enough to use a "U bolt" style TV clamp to hold the element on to the boom.

For 14 MHz the tube length is 10 m and the element spacing 2.1 m. The phasing line is 72 ohm twin lead, 2.46 m long, transposed, whilst matching to a 300 ohm line is by a 3.6 m length of the same 70 ohm twin lead. A version using folded dipole elements is shown in Fig 21.

VHF Construction has been well recorded in Fred Judd's (G2BCX) article, ZL Special 2 m Beam, in "Out of Thin Air", a *Practical Wireless* publication.

Part 3, the final of the series on *Some Useful Wire Antennas for HF*, will appear in next month's issue of *Amateur Radio.*

15 Grandview Avenue, Urrbrae SA 5064

ar

■ Antennas

Output Balance on the Z Match

Lloyd Butler VK5BR* with more information on the ubiquitous Z match

Introduction

Just when we thought we were all through with testing Z match tuners, something else turns up. Recently, Rob Gurr VK5RG brought my attention to an article in the Winter 1995 issue of *Communications Quarterly* by Charles A Lofgren W6JJK, titled "Beyond the Z Match".

In the article, the writer expresses concern that the assumed balanced output circuits of many of our antenna tuners actually introduce unbalanced currents on balanced lines. He points out that this becomes particularly serious when the load impedances become very high, such as when tuned feeders of certain critical lengths are used. The unbalance produces high radiation from the feedline, possibly encouraging RFI problems, unwanted RF in the shack and changes to the radiation pattern of the antenna.

One of the features we have promulgated for the Z match is that it is suitable for both unbalanced and balanced output and the point of my attention is that W6JJK targets the Z match as one of the tuners which introduce the unbalance mentioned.

Of all the test results I have previously submitted for various Z match models, none has included tests to assess output balance. Hence the question now arises of how good, or how bad, is the balance of the Z match output circuit and that is

Figure 1 – Measurement of output balance.

the subject of this article. In the following paragraphs I discuss tests to determine the degree of balance, the results obtained and an idea to improve the balance.

Measurement of Balance

W6JJK describes a method of measurement to determine output circuit balance for a given load resistance. As shown in Figure 1, a resistor of half the load resistance value is connected from each balanced output leg to ground. RF power is fed into the tuner which is set up for a correct match into the resistance load. The voltage is measured across each leg to ground using a high impedance probe. The ratio between the two readings is a measure of the degree of balance.

I used the above method to measure the balance of a single coil Z match. We have described several versions of these in *Amateur Radio*, but the one used has the coil windings spiralled through the drilled perspex sheet and designed to operate over the 3.5 to 28 MHz range. I point this out because I suspect that this air spaced version would measure better than the version wound on coil formers. I used half watt terminating resistors and reduced the transmitter power to a very low value so that the resistors did not burn up. I have a 0.5 watt FSD scale on my SWR meter which enables me to monitor this. To measure the voltages across the resistors I used a high impedance RF probe with a VTVM.

Results

Measurements were carried out for loads of 200, 660, 1120 and 2000 ohms using resistors of 100, 330, 560 and 1000 ohms respectively. Frequencies of measurement were 3.5, 7, 14 and 21 MHz. The probe capacitance is quoted as 2.5 pF with several kilohms resistance (depending on frequency).

This would seem adequate for the test, but I found it did tend to alter the loading a little at 21 MHz. I gave away the idea of recording measurements at 28 MHz as I felt the figures I obtained were too much affected by the probe. The results obtained are recorded in Table 1. The figures are given as the ratio of the lowest leg voltage to the highest leg voltage expressed as a percentage.

Band (MHz)	Load resistance (ohms)			
	200	660	1120	2000
3.5	94	98	91	92
7	97	93	84	74
14	95	85	83	50
21	88	78	61	42

Table 1 - Percentage balance at load.

Just what figure of balance is to be considered satisfactory is probably open to debate. For the purposes of definition I will nominate figures above 90% as being quite good and above 80% as being tolerable. Applying these rules we find that there is a good balance at 3.5 MHz for load resistances up to at least 2000 ohms, and a good or acceptable balance at 7 to 21 MHz for load resistances up to around 500 ohms. At higher resistances above these frequencies (and in particular at 14 and 21 MHz), the balance is not so good.

Improving the Balance

The main theme of the W6JJZ article is the introduction of a circuit, more complicated than the Z Match, specifically designed to improve the output balance. He has called this the IBZ Coupler. In his coupler he uses a tuned coil arrangement, which covers two tuning ranges as in the Single Coil Z Match, but the tuned circuit is balanced by a split coil and a four gang tuning capacitor instead of a two gang. The coil assembly has a primary and secondary winding, as in the Single Coil Z match, but the secondary is tuned, whereas the Z Match tunes the primary. Taps on the secondary are also switched to select different load impedance ranges.

Unfortunately, the W6JJZ design gets away from the simple concept of our *Amateur Radio* Single Coil Z Match with only a single coil assembly and no switches (refer *Amateur Radio*, April
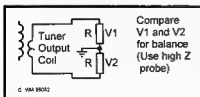
1993) The four gang tuning capacitor is also a further complication. Two gang capacitors are difficult enough to find as it is. Fortunately, there is a simple way to improve the RF match output balance without circuit re-arrangement.

Recalling the results of my tests, output balance seems to be only of concern if you are using balanced lines which reflect a resistance component of above 500 ohms and the operating frequency is 7 MHz or above. If your operation does not include all those conditions, then there is no problem and there is no need for anything to be done. Even at 7 MHz the unbalance figures are not really that intolerable.

On the other hand, if you must operate high impedance balanced lines in the upper HF bands, you might consider a small modification to the Z Match which I will describe. However, before doing so, let's examine why the unbalance occurs. The unbalanced signal component is coupled longitudinally into the output secondary winding of the Z match coil via capacitance between the primary and secondary windings. Its voltage on one leg of the output winding relative to earth is different from the other leg because, generally, the capacitance of one leg to earth will differ from the other. A voltage balance can be achieved by altering the relative values of the two capacitances to earth. To do this, a small variable capacitor of around 20 to 25 pF is connected between earth and the output leg furthest from the cold, or earthy end, of the primary winding (refer figure 2).

I found that in my single coil Z match, the balancing capacitance added need to be around 15 to 20 pF, its value being a little different for the different bands. To set the variable capacitor, the test set up with the two terminating resistors used

again used and the capacitor is adjusted for equal voltage at the two output legs to earth. This could be set for balance on the band where it is most needed with, perhaps, some out-of-balance error on other bands.

The same unbalance test can also be carried out to check the coupled system using the actual balanced antenna instead of the terminating resistors and measuring the RF voltage at each leg to earth as before. This can give some surprises when you find out the balanced antenna line isn't quite balanced at all. When the line is connected to the tuner output, the line unbalance is either added to the tuner unbalance, or corrective of it, depending on which way around the line legs are connected. The balancing capacitor can be used to balance the resultant of the two together.

Adding capacitance at one leg might make the voltage unbalance worse. If this is the case, the balancing capacitor must be connected to the other leg. Incidentally, to determine whether any unbalance is in the antenna line itself, it is only a matter of observing the two leg voltages when the line connections are reversed. If the highest and lowest readings interchange, then there is unbalance in the line. Of course one should not get too pedantic about this as a small unbalance might have little effect on the overall performance of the antenna system.

More Tests on the Two Coil Unit

To get another assessment of output balance in the Z Match, I repeated the tests on the "Compact Coil" or "Rononymous" version of the two coil Z Match. The following is a summary of the results.

Good balance was achieved at 3.5

MHz using coil A for output loads up to 1000 ohms, but not at 2000 ohms. A good balance was also achieved at 7 MHz with coil A up to 660 ohms. Coil B gave surprisingly good balance at 14 MHz over the whole tested load range of 200 to 2000 ohms. By contrast, at 21 MHz with coil B, poor balance was experienced over the whole of the load range.

The results are somewhat more random than obtained using the single coil Z Match, but the general trend is the same with balance deteriorating at the higher frequencies and when the load resistance is very high.

Summary

One of the features of the Z Match tuner is that it is suitable for both unbalanced and balanced loads. Just how good a balance it provides on balanced loads has been questioned. Tests described indicate that the balance is quite good at the low end of the HF band, such as 3.5 MHz and, to a lesser extent, at 7 MHz. At 14 MHz the balance seems reasonably good, provided the load resistance is not too high. At 21 MHz the balance for low load resistance appears tolerable for the Single Coil Z Match but not so good for the Compact Two Coil Z Match. No tests were carried out at 28 MHz.

Correction of the output circuit unbalance, using a small variable capacitor across one leg of the output circuit, has been discussed.

For most applications using the Z match tuner, one can forget about output balance. Our only concern is when we feed high impedance balanced lines on the upper HF bands.

References

1. Charles A. Lofgren W6JJZ - Beyond the Z Match – Communications Quarterly, Winter 1995.
2. Lloyd Butler VK5BR AR Single Coil Z Match - Amateur Radio, April & May 1993. Also refer to Random Radiators – Amateur Radio, February 1993
3. Lloyd Butler VK5BR – Tests on the Compact Coil Z Match – Amateur Radio, December 1990. Also refer to Random Radiators – Amateur Radio, March 1990.

*18 Ottawa Avenue Panorama SA 5041
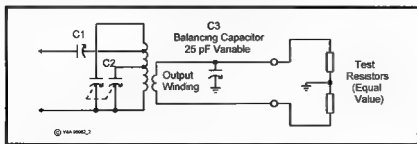
Figure 2 – Capacitor C3 added to correct for output balance.

■ Insurance

Is Your Mobile Gear Insured?

Michael Krochmal VK3KRO* explains some facts about equipment insurance.

Introduction

In reading back through some old issues of *Amateur Radio*, I encountered something of importance to, and containing implications for, radio amateurs. I refer to the matter of insurance of mobile communication equipment, which was mentioned, for instance, in a brief note in *Amateur Radio* for December 1988.

At the risk of insulting the more knowledgeable readers (who may like to find instant relief by turning to the next article in this issue) I would like to outline briefly the process of insurance. There seems to be a common misconception about what constitutes the commercial and contractual basis of an insurance policy of any kind and, more specifically, what are the entitlements and duties relating to insurance of mobile communication equipment.

The Dreary Legal Bit - Disclaimer

Please let me hasten to reveal, at the outset, that I do not work in the insurance industry, nor am I a property lawyer. I am an engineer, and must admit to a large degree of ignorance with respect to all aspects legal and insurance-related. The comments which follow are simply a summary of information I have gathered. They are intended as food for thought, and a stimulus for intelligent action, not as legal advice. I must therefore refuse to accept any legal liability for any events arising out of these comments and would strongly suggest that the individual reader seek the advice of a good insurance broker.

Insurance From the Ground Up

The basic mechanism of insurance is this:

The insured person owns property A (a car, for instance), and property B (a mobile transmitter and antenna, for instance). As protection against possible future loss, he/she negotiates an insurance policy over part or all of these goods. One typical type of policy often used for this purpose is one known as a Motor Vehicle Policy.

> *Generally, a Motor Vehicle Policy would not cover communication equipment for damage or loss at all*

There are two possibilities:
1. only the car itself is insured; or
2. both the car and its "non-usual accessories" contents are insured. In this context, "non-usual" means anything fitted to the car which is not usually supplied with such a car at the time of purchase. Examples might be a very expensive sound system, amateur radio communication gear, etc. This definition is actually quite vague, but the main criterion which distinguishes usual from non-usual is basically price. (So, if the usual $300 radio is replaced with a surround-sound, super-sensational $3,000 radio, that definitely constitutes a non-usual accessory. If included with the list of objects insured, it substantially increases the financial risk to which the insurer is exposed).

In order to cover such equipment, it must be "specified" This means that it must be separately itemised as being covered by the insurance.

To make this quite clear If a non usual item is not specified, it is not insured.

An Alternative Cauldron Containing Piscatorial Entities (or, A Different Kettle of Fish)

Generally, a Motor Vehicle Policy would not cover communication equipment for damage or loss at all, unless that equipment was specified separately. If the equipment was covered, it would be covered by the normal motor vehicle conditions, which would not include some events that may actually be vital, such as loss or damage while the equipment was not in the vehicle (eg dropping unit while carrying from shack to vehicle or vice versa).

Even if the equipment WAS covered, payment of a claim for loss or damage to such equipment would be subject to the usual policy excess. This excess amount could be anything in the range of $300 to $1,500, depending on the make and model of the motor vehicle. In the event of a claim, the amount of the payout is reduced by the amount of the excess. The excess may actually exceed the value of the equipment in the first place.

An even more disturbing thought is that, because communication equipment is so attractive to would-be thieves, some insurers may actually refuse to insure it at all! And if they do insure it, the amount of the premium might be quite considerable

You may like to explore another way of insuring the equipment, a General Property Policy This is a policy similar to one you can use for insuring other portable goods such as expensive watches or necklaces (you know, the ones you put in hock to pay for the Kenwood!) Those policies are called "Personal Valuables Policies" and provide cover for **virtually** all physical loss or damage For the General Property Policy, you would need to specify particular events, which would normally be fire, theft, malicious damage and **EITHER** accidental

damage **OR** accidental damage following collision or overturning of the conveying vehicle.

There are two great advantages of a General Property Policy over a Motor Vehicle Policy.

1. a General Property Policy can apply ANYWHERE IN AUSTRALIA and is not restricted to the equipment being in the car
2. the amount of excess is likely to be lower than for a Motor Vehicle Policy

There is one particular to be careful about. Make sure that the policy does not contain a clause saying that cover for theft is only effective following forcible entry. This would mean that, unless the theft occurred from a locked motor vehicle or home, and forcible entry could be demonstrated, the insurance company would not come to the party. In particular, this would mean that if you left your HT on the beach, or it was taken while you were splashing about in the water with your Donald Duck lifesaver ring, such loss would not be covered.

What's Covered? – How Does a Claim Work?

Let's assume that the communication gear we are talking about has been specified under a Motor Vehicle Policy. You have items of property A and B (car and communication equipment), covered by insurance policy modules IPM$_A$ and IPM$_B$. The contract between the insured person and the insurance company basically says "*If the items covered by the policy are damaged or destroyed, the insurance company undertakes to offer repair or compensation for loss of these items*". (Notice I did not say replacement – we will come to that shortly).

As far as ownership of this property is concerned, the position is:

A. Before an event leading to a claim, ownership of the car and other equipment is clearly vested in you, the owner. The insurance company collects premiums in return for a promise of assistance in the event of an adverse situation. The insurance company basically takes a statistically (actuarially) based gamble that it will

collect more revenue in premiums than it will pay out in claims. Sometimes this works, sometimes it does not (see Lloyd's of London).

B. Immediately after a (for you) disastrous event has taken place, you still own the (remains of) your car and communication equipment. You still have a contract with the insurance company, which will result in your being compensated for the disaster, provided that a number of conditions apply:

B1. You have not been naughty (eg drunk driving, not telling the insurance company about prior events which might influence their decision to get into this risk-taking venture with you, etc).

B2. The (for you) disaster has been one of a number of particular events. Usually, there are specific exclusions such as public riots (French nuclear testing?), "acts of God" (whatever they may be – isn't being born an act of God?), and various other things. Note, however, that a Motor Vehicle Policy usually specifies "Physical Loss or Damage" being grounds for a claim. This includes accidental damage, malicious damage, theft of or from the vehicle (whether the vehicle is locked at the time or not!), and fire.

B3. You have been a good boy/girl and paid your insurance premiums.

B4. The claimed loss or damage actually exists! (This may surprise you, but there are some unscrupulous people in this world – detecting them is how insurance loss assessors earn their pay).

C. Having sustained the (for you) disastrous event, you can now choose to activate the agreement between you and the insurance company. Basically, it works like this. The ownership, for the moment, of the car and communication equipment, has not changed. You still own the damaged or lost car and communication equipment. What the insurance company does is to offer you a fair deal (which you may or may not think is fair). This may involve

surrendering your ownership of the damaged property to the insurance company, in exchange for which the insurance company will perform one of a number of duties.

Before we get on to these, please note that, **until you agree to an exchange of ownership, the insured property belongs to YOU!** An agreement must be signed by both you and the insurance company before a transfer of ownership can take place. Such an agreement would be signed as part of the performance of some of the following duties by the insurance company.

The options are as follows. The insurance company can:

C1. Repair the damaged property and return it to you, suitably repaired (in this instance, there is no exchange of ownership).

C2. Compensate you for the loss of, or damage to, your property, by exchanging the ownership of such property for an agreed sum. In other words, they get the goods, you get the money. By the way, speaking of money, the actual amount is obviously of interest. There are some types of insurance where the amount is "replacement value". In other words, you will receive whatever it takes to go out and buy a new item. It is also possible to have a policy based on "market value", where the amount paid out is the amount which the property would currently bring if sold on the open market, or the amount required to buy a similarly used item. For communication equipment, these valuation types do not actually apply. Instead, the amount paid out is usually a fixed value agreed in advance. Depending on various market forces (new models being released, sunspot activity?) this may be a factor in your favour or to your detriment. Now what's in it for the insurance company? Obviously they can take your damaged property and either sell it for scrap, or fix it and sell it for what they can get for it

C3. You may prefer to do NOTHING

(ie repair or replace the item yourself) The reason for this is something called an insurance policy excess. This is a sum of money which you must first pay before the insurance company comes to the party with the balance. Generally, there is some excess on nearly every insurance policy these days, in order to avoid minor "nuisance" claims, where the cost of administration and the time involved exceeds the benefit to either party. There may also be further excess amounts, and there can be various reasons for the incorporation of such extra excess amounts in your policy. One of them, in the case of a Motor Vehicle Policy, is if the car is driven by young people, on the assumption that young people are more often involved in accidents. This appears to be a fact which is supported by the statistics. (Whether they actually CAUSE these accidents or not is another issue – maybe yes, maybe no). Apart from all that, if you make a claim, the insurance company in many cases will decide that you are an increased risk, and may increase the amount of premium you have to pay (loss of no-claim bonus). So in some cases, the amount of the excess and the increased premium may well outweigh any advantages arising from a claim.

D. Having agreed with the insurance company about the course of action, you must of course stick to your part of the bargain. It would be unreasonable to expect the insurance company to pay you for your loss if there was no loss. What I mean is that, if you agree to be paid out for a total loss, then you can't also retrieve your communication gear. But this is a double-edged sword. If the insurance company disallows the claim and does not pay you the compensation, and you do not sign over ownership, then the gear is clearly still yours! They will, in due course, return the pieces of smouldering ruin or magnificently functioning equipment (as the case may be) to you.

What Does the Term "Communication Equipment" Apply To?

Please note that, throughout this article, I have mostly referred to "communication equipment" rather than mobile transceiver. The above considerations apply equally to amateur radio gear, mobile telephones, mobile faxes, fancy sound systems, and even (dare I even mention it without incurring indignant wrath from some quarters?) the dreaded CB radio gear.

Even a diamond-studded world globe indicating time zones and day/night terminator. In fact, anything which is not a usual piece of equipment in the car.

"Look Ma, No Hands!"

Closely related to this issue is the issue of driving while operating communication gear. This is an issue which is very dear to my heart, as I have several times been placed in jeopardy by blissfully unaware drivers prattling away on their mobile telephones while weaving all over the road!

I think that this is a dangerous habit which we, as a community, should stamp out. In my book, if you can afford a mobile (I call them Pose-a-Phones, but I recognise that they are essential for some people!), you can afford the hands-free kit. The reason I mention this here is that if you are in an accident and it can be demonstrated that the accident was caused by the fact that you were using a hand-held piece of equipment at the time, the insurance company will (surprisingly, in my book) still pay up (whereas they will not pay if you are drunk). However, you may face criminal charges, but that's beyond the scope of this opus major.

Steps You Can Take (No, Not Tango Lessons Again!)

Whatever eventually you may plan for (and forewarned is forearmed), it is really a wise move to identify your communication equipment (in fact, it's a good move to identify ALL your valuables). This avoids a lot of grief in the event of disaster, whether the event is fire, theft, auto accident, or whatever (and may you never meet up with any of the above).

1. In the first place, try to avoid buying

stolen goods. Check the regular "Stolen Equipment Register" in *Amateur Radio*. If you come across a piece of evidently stolen gear, ring the Federal Office of the WIA immediately. No doubt the civil libertarians will now immediately jump down my throat, but I'll take the risk. I believe that it would help a lot if journals taking advertisements for gear made it mandatory that serial numbers be disclosed in the advertisements (I'll brace myself for the onslaught of abusive letters in "Over To You"!).

2. "Having caught your rabbit, cook it" (*Mrs Beeton*) – having bought your piece of equipment, check out each item and make a note of the following data, and keep it in a secure place:

2.1 Manufacturer's name (eg ICOM)

2.2 Model name or number (IC-W2A)

2.3 Type of equipment (Dual-band HT)

2.4 Serial number (0006754)

2.5 Fitted options (Loud speaker/ microphone)

2.6 Any special identifying characteristics ("MUM" tattooed on bottom).

3. (I know that the purists will now wince!) If possible, apply a permanent, unique, mark to each item. This can be applied in a number of ways:

3.1 Use an engraving tool (Ouch! I can hear some of you saying)

3.2 Use a fluorescent pen, whose marks are invisible in ordinary light

3.3 If you are worried about compromising resale value, use an ordinary method, such as felt pen, paper label, etc in a very inaccessible place (such as inside the gear), where it would normally be overlooked by a prospective thief.

There is a range of information you can use for identification:

3.4 The most useful, probably, is the number of your driver's licence, with a "V" in front for Victoria (or whatever applies to your home state). This is a readily recognisable and easily traceable number

3.5 Another possibility is your name. This may be OK if your name is Michael Krochmal (not too many of me around, I believe) but may be a problem if your name is John Smith (no offence intended, John Smith!)

Perhaps you could use a nickname if it's unusual.

3.6 Another is your callsign, but remember that this may be assigned to someone else one day, especially if you do not yet have a full call.

3.7 Keep in mind that telephone numbers and email addresses may also change.

4. If at all possible, take one or more good, clear photographs of the gear. Don't forget to add something in the photo which will give an idea of scale (such as a ruler or a box of matches or the wife/husband). This will help the police or anybody else whom you may want to help you to look for it - not everybody knows what your "homebrew ATU" looks like.

5. Other things you can do are:

5.1 Ensure that your car is locked at all times if left unattended. This may sound like trite advice, but it's amazing how many thefts take place from unlocked vehicles.

5.2 Don't put temptation in someone else's way: not everyone can resist the attraction of a gleaming panel of shiny buttons. If possible, try to cover the equipment. There have been articles published about dash-mounted equipment for which the owner has devised a "dress-panel" to get the gear out of view when not used.

5.3 Still in the spirit of the previous item: consider the setup offered with current commercial gear, where the main unit is actually in the car boot, and the dashboard incorporates only a small, more easily hidden, control panel. Can your gear be modified to emulate this? (A lot of units have computer-control interfaces - can you use this for frequency shifting, etc?) Maybe the boot's too far away, but you can still put the main unit under the driver or passenger seat? (Added advantage in winter - long overs will keep your bottom warm!). An added advantage is that it may be easier to find an insurance company willing to install wiring systems installed in this less prominent manner.

5.4 Consider carrying a fire extinguisher. With some insurers, you may perhaps qualify for a lower premium. If the worst comes to the worst, the extinguisher might come in handy for dousing the out-of-control BBQ at the field-day function.

5.5 Consider also installing a car burglar alarm if not already fitted. Fairly cheap ones are now available at the usual places and most radio amateurs ought to be sufficiently technically adept to install one. Consider the commercial risk and cost/benefit ratio: what's cheaper - a car alarm or repairing/replacing your car and contents? Try to get an alarm that's convenient to use - if you get lazy and don't turn it on EVERY TIME, you might as well forget it. There's a corollary to Murphy's Law called Krochmal's Korollary (a type of Japanese motor car): "Cars are always stolen on the ONLY occasion on which the car alarm has NOT been armed, no matter how many times the alarm actually HAS been set". It's

just like married life: it's not the 2,398 times you squeeze the toothpaste tube at the "politically correct" end – it's the one time you don't

5.6 All of the foregoing applies also to your antenna, which may be quite an expensive item. It is also a great advertisement to a would-be thief that there is something worth stealing in the car. A removable unit is great, but may not always be practical. Magnetic mounts are good if you remember to take the antenna down and throw it in the boot each time (Kroch's Korollary again). There have been complaints that the magnetic mount still manages to scratch the car's Duco, and there have been many suggestions to avoid this, including putting a plastic shopping bag under the mount. Anyway, at least a magnetic mount will allow you to avoid drilling a nice big hole in the panel work of that brand new Porsche.

5.7 Another possibility is to mount your mobile unit in a cradle, so that you can take it with you when the car is unattended. Two issues: "Issue the first" – see Kroch's Korollary, item 5.5. "Issue the second" – the cradle itself may have some considerable value (platinum-plated contacts – who knows?). If the cradle is not specified in the policy, this would mean that the item is not intended to be covered, so you will not be compensated in the event of loss. (But you WILL own it in the event of a write-off, etc – see discussion of that issue above).

5.8 Try to keep away from the usual sleazy places which are havens for burglars: dark, lonely areas generally, and railway station car-parks and the vicinity of movie houses and shopping centres specifically. The reason is that would-be thieves know that you will most likely be gone for some time, and they have plenty of time to do their thing.

5.9 Easier said than done, this one, but still at least partly under your control: try not to get into an "accident" in the first place. These days, it's unfortunately more essential than ever to "drive for the other guy/gal" who may, for instance, be chewing the fat on the mobile telephone and not concentrating on driving (am I asking for another broadside in "Over To You"?). Your own skills are only half of the equation. Perhaps consider doing an advanced driving course (shock, horror!).

Summary

A brief outline has been presented of insurance of mobile communication equipment, and its ramifications.

A Big "Thank you"

I would like to particularly thank Mr G B Hiscock for his very kind assistance in supplying a wealth of insurance-related information. Any errors are all mine. I hope that this material will be of some small help to my fellow radio amateurs, and here's wishing that you will never have to activate a claim !

*PO Box 112, Ormond, Vic 3204
Tel (03) 9596 8065 Fax (03) 9596 8369
email mike=kroch.bmsl@vut.edu.au

Related Articles

A. **Mobile communication equipment – insurance**
1. "Car Insurance" ANARTS, supplied by VK2EMV.
   Amateur Radio Vol 56 No 12, December 1988 p57
B. **Mobile communication equipment – legal aspects**
1 "Communications Equipment", Excerpt from Victorian Road Safety (Traffic Regulations), 1988.
   Amateur Radio Vol 56 No 12, December 1988 p8
2. "Mobile Phone Ban". Information, *Amateur Radio* Vol 57 No 6, June 1989 p2
3 "Mobile Law", Over To You, George H Cranby VK3GI
   Amateur Radio Vol 57 No 10, December 1989 p60
4 "Hands Free", Over To You, Peter Russell L50567
   AR, Vol 58 no. 1, January 1990 p 58-59
C. **Mobile communication equipment – practical aspects**
1. "Mobile Operation", Graeme McDiarmid VK3NE,
   Amateur Radio Vol 60 No 3 March 1992 p11 12
   ar

WIA News

New WIA Members

The WIA bids a warm welcome to the following new members who were entered into the WIA Membership Register during the month of February 1996.

■ People

Frank Hine VK2QL

Susan Hine, Frank's daughter, donated the trophy featured on the front cover of this magazine. The trophy uses Frank's original Morse key. Here, Susan tells a little of her father's life.
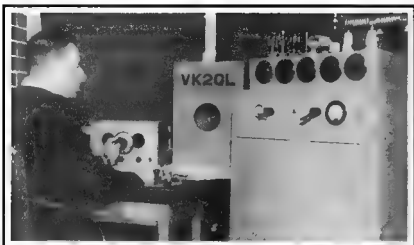
Frank Hine VK2QL operating his station in 1938, using the Morse key which is now part of the Frank Hine Memorial Trophy for the VK/ZL/Oceania DX Contest CW Section.

Frank Hine was born in Sydney on 6 October 1907. His father was a captain in the merchant navy and was often away from home. Frank was the oldest of seven children and the family first lived at Glebe and then Campsie.

When he left school he worked in a solicitor's office for approximately 12 months. He then gained an apprenticeship with the NSW Railways as a fitter and turner. Once he had completed his apprenticeship, he was laid off in 1930 during the Depression.

In order to gain work, he travelled to Temora where he worked on the railways and any other work he could find. It was here that he met Gordon Reid VK2OW who introduced him to amateur radio. He remained close friends with Gordon and Freda, his wife, until Gordon's death. He was best man at Gordon's wedding.

F. HINE, 19 Albert Street, CAMPSIE, N.S.W.

VK2QL

Frank's original QSL card, printed when he first became active as an amateur operator in 1935.

Frank made his first QSO on 30 March 1935. He had his "shack" set up in a small shed in the garden of the house in Campsie.

He joined the RAAF in 1935 and was stationed at Richmond where he met Marjorie Mortimer. They were married in August 1937. They had two children.

In the RAAF he was placed in the Signals section. During the war he was posted to Brisbane, New Guinea and Darwin. For part of this time he was in recruitment and was training new recruits in Morse Code. The VK2QL station was closed on 1 September 1939 owing to the declaration of war, and reopened on 3 February 1946. The only other time that VK2QL was not operating was when he spent approximately four years in Townsville with the RAAF. While in Queensland he had the call sign VK4QL.

He retired from the RAAF in 1956 and worked for Clyde Engineering for a time, and then Tooheys until he retired.

CW was his passion and he made most, if not all, his QSOs by key. He won or was highly placed in many contests over the years, his first being the Melbourne Centenary Contest in Receiving in 1934. He won, or was placed, in a number of the CW sections of the VK/ZL Oceania DX Contest.

Frank became very active in the NSW Branch of the WIA and, for a number of years, was the manager of the QSL Bureau. He took regular part in the broadcasts on Sundays and was involved in the setting up of VK2WI at Dural.

He regularly wrote for *Amateur Radio* magazine, particularly the Ionospheric Predictions.

He became a member of the FOC Club in January 1966. He and Marje went to America in 1974, 1981 and 1982 to the FOC Dinner and to meet many of the people with whom he had regular contact over so many years.

Although poor health prevented him from working on-air in the years just prior to his death, his last contact being in 1992, he kept his licence until his death on 26 March 1994 (Marje had died approximately 6 months before him).

Frank Hine had been a ham for 59 years.

ar
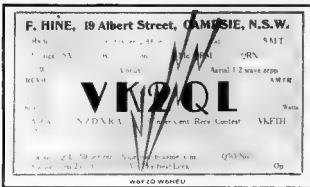
■ Technical

Technical Abstracts

Gil Sones VK3AUI*

LF News

In the January/February 1996 issue of the New Zealand *Break-In* magazine, there is some news regarding 160-190 kHz operation. In the LF Scene column of Andrew ZL2BBJ and Bob ZL2CA there is news of an allocation in Papua New Guinea from Rick Warnett, president of the Papua New Guinea Amateur Radio Society.

Apparently, in Papua New Guinea the band 160-190 kHz has been allocated with a power limit of 10 WEIRP. This is interesting and the power limit is reasonable considering the likely efficiency of aerials. There may well soon be contacts between PNG and New Zealand. To achieve the power limit with a 10% efficient aerial would take 100 watts and aerials at a less efficient at this frequency band. The limit is really not so bad.

Dual Band Mobile Comparison

Only a large organisation like the ARRL can afford to buy eight different mobile dual band transceivers to conduct a comparative review. Indeed, all reviews in *QST*, the ARRL journal,

Figure 1 - Buzzer Noise Source.

are of equipment purchased over the counter. The models in this review are similar to those available in Australia.

The review appeared in *QST* for November 1995, and was conducted by Steve Ford WB8IMY, *QST* Assistant Managing Editor. A panel of reviewers assessed the performance of the radios.

The technical measurements make interesting reading. The radios all met their specifications. Some measurements were, however, of parameters not specified.

A previous "Handheld Roundup" from the October 1992 issue of *QST* was summarised in the April 1993 issue of *Amateur Radio* magazine, on page 15. The results make interesting comparisons. The handhelds were fairly close in performance to the mobiles. The comparison of 9600 baud packet-ready radios in *QST* for May 1995 was given in *Amateur Radio* for October 1995 and this is also interesting reading.

The Bit Error Rate (BER) information is of interest to anyone contemplating 9600 baud packet. In general, 9600 baud operation is considerably more difficult than the usual 1200 baud VHF/UHF operation. This is reflected in the results obtained in the BER tests. The BER tests at 9600 baud were performed on those radios claimed to be 9600 baud packet ready.

The results obtained are contained in Table 1. The BER may be unfamiliar to readers. The BER is a measure of the performance of a digital communication circuit. It is simply a measure of the number of bits which are sent through the system incorrectly. A packet contains around 1000 bits, so that if the BER is around 1 per 1000 (or 1 x 10^{-3}) the system will be just about unusable. If the BER is 100 times better at 1 error per 100,000 bits (or 1 x 10^{-5}) then the system will be much better and you may not notice the losses. The figures are shown in Table 1.

The sensitivity of the receivers is given in dBm and the impedance is 50Ω. This is used in preference to the input voltage in microvolts and is quoted for 12 dB SINAD. This allows a more meaningful comparison once you have adjusted to the nomenclature. It also gives a better idea of how big a signal you will need to get good 9600 baud performance.

The interesting thing is that the receiver sensitivities are in the same range as the handhelds, whilst the intermodulation performance is only a little better in most cases. Small wonder that so many operators experience disturbance from adjacent services. You can't blame the pager most of the time.

The current drain is much higher than the handhelds and the current must be used to run the displays and the processor rather than provide superior receiver performance.

The HF transceiver has been considerably improved and the VHF/UHF transceiver is sorely in need of improvement. The techniques used are available at VHF and UHF and the improved strong signal performance is sorely needed.

The transmit to receive turn-around time is of interest for packet operation. However, the prime thing is to be receiving or transmitting intelligible packets, which is different to full audio or RF. The figure given, however, does give an indication.

The transmitter power levels reflect the use of power output modules.

Buzzer Noise Source

A handy non-critical noise source can be made from a buzzer and a battery. A modern version was described in *Radio Communications* magazine for January 1991 by David Sumner G3PVH. This
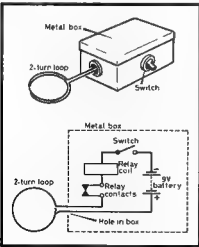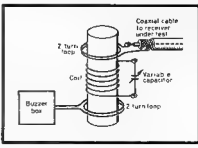
Figure 2 - Using Buzzer Noise Source to Find Resonance.

Table 1

Radio		IC2700H ICOM	IC2340H ICOM	TM742A KENWOOD	TM733A KENWOOD	C5718DA STANDARD	DR610T ALINCO	FT5200 YAESU	FT8500 YAESU
Sensitivity dbm for 12 dB SINAD	144 MHz	-123	-124	-125	-125	-123	-124	-125	-125
	432 MHz	-125	-123	-124	-124	-125	-123	-124	-124
Two Tone 3rd Order IMD Dynamic Range 20 kHz Offset dB	144 MHz	73	62	71	67	77	73	77	76
	432 MHz	70	64	70	64	72	75	69	62
	52 MHz			71					
Adjacent Channel Rejection dB 20 kHz Offset	144 MHz	58	60	73	71	66	70	64	74
	432 MHz	59	63	66	67	65	67	70	70
	52 MHz			79					
Tx Output Power Watts	144 MHz								
High		52	46	50	50	53	51	50	49
Med		10	11	11	12	10	9	5	10
Low		4	5	5	5	3	3	4	4
	432 MHz								
High		37	33	33	36	35	35	33	32
Med		11	11	11	12	8.5	9	5	9
Low		5	5	4	5	3	4	4	4
	52 MHz								
High				53					
Med				11					
Low				4					
Tx/Rx Turnaround Time m/S	144 MHz	300	220	110	160	175	245	145	145
	432 MHz	300	200	110	105	175	240	75	142
	52 MHz			110					
Rx/Tx Turnaround Time m/S	144 MHz	225	225	100	110	150	104	93	25
	432 MHz	225	240	104	125	150	108	64	70
	52 MHz			48					
Rx BER 9600 Baud at 12 dB SINAD	144 MHz				1.5×10^{-3}	7.0×10^{-4}	1.0×10^{-3}		5.1×10^{-4}
	432 MHz				1.5×10^{-3}	1.0×10^{-3}	7.2×10^{-4}		4.1×10^{-4}
Rx BER 9600 Baud at 16 dB SINAD	144 MHz				4.8×10^{-5}	$<1.0 \times 10^{-5}$	$<1.0 \times 10^{-5}$		$<1.0 \times 10^{-5}$
	432 MHz				6.2×10^{-5}	$<1.4 \times 10^{-5}$	$<1.0 \times 10^{-5}$		$<1.0 \times 10^{-5}$
Rx BER 9600 Baud at -50 dBm	144 MHz				$<1.0 \times 10^{-5}$	$<1.0 \times 10^{-5}$	$<1.0 \times 10^{-5}$		$<1.0 \times 10^{-5}$
	432 MHz				$<1.0 \times 10^{-5}$	$<1.0 \times 10^{-5}$	$<1.0 \times 10^{-5}$		$<1.0 \times 10^{-5}$
Tx BER 9600 Baud at 12 dB SINAD (Rx Sig)	144 MHz				1.7×10^{-3}	4.3×10^{-3}	4.2×10^{-4}		2.4×10^{-3}
	432 MHz				3.4×10^{-3}	2.6×10^{-3}	4.7×10^{-3}		2.7×10^{-3}
Tx BER 9600 Baud at 12 dB SINAD + 30 dB (Rx Sig)	144 MHz				8.0×10^{-5}	3.4×10^{-4}	4.2×10^{-4}		1.2×10^{-4}
	432 MHz				3.3×10^{-4}	2.0×10^{-4}	5.6×10^{-4}		6.6×10^{-4}
Tx Current Amps		10.8	9.2	9.5	8.8	9.7	9.4	8.5	9.1
Rx Current Amps		1.4	1.1	1.2	0.8	1.0	0.8	0.9	0.9

uses a small relay connected so as to act as a buzzer.

A buzzer, by its action, provides noise both acoustic and radio. The radio noise is the result of the sparking due to the inductive spike as the coil current is interrupted Mechanical buzzers are less common today and one can be made from a small relay connected as in Fig 1.

The buzzer should be built into a metal box to provide some screening and the relay should be wrapped with foam to attenuate the acoustic noise. A similar arrangement was used for continuity testing, to do this the loop of Fig 1 should be replaced by clip leads.

To find the resonant frequency of a tuned circuit the test setup of Fig 2 is used. The noise from the buzzer will peak at the resonant frequency of the tuned circuit. A simple transistor radio
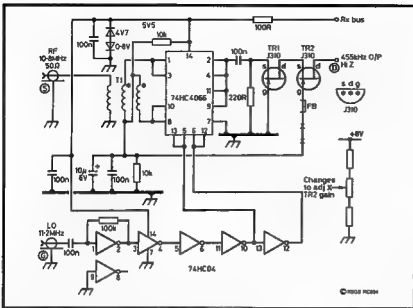
Figure 3 - Switching Second Mixer for FT726A.

Figure 4 - Duplex Bell Circuit.

with short wave coverage can be used as the detector to find the noise peak. A 10 turn coil of 30 mm diameter will resonate in the 10 MHz region with 100 pF.

The noise from the buzzer can be used as a simple check to see if a receiver is working. Switching it on and off in the vicinity should be detectable.

Do not couple the buzzer to an antenna as it will then try to act as a rudimentary spark transmitter. This could result in local interference.

Low Cost High Performance Mixer

A low cost high performance mixer appeared in the *Technical Topics* column of Pat Hawker G3VA in the January 1996 issue of the RSGB journal *Radio Communications*. The original idea for the mixer had appeared in RF Design for June 1995 and the author was P J Coetzee, who based his work on an idea by J M Grundlingh. The *RadCom* item reported further work by Giancarlo Moda I7SWX who adapted the idea to use readily available fast CMOS.

Giancarlo used a 74HC4066 quad switch as a replacement second mixer in a Yaesu FT726A. The aim is to provide superior intermod performance with superior dynamic range. This sort of mixer has been used at LF for many

years and the use of fast CMOS has enabled use at much higher frequencies.

The mixer is shown in Fig 3. The S, D & G connections refer to the source, drain and gate connections to the original FT726A second mixer. The circuit was built on a small scrap of board to fit in the transceiver. The JFET post mixer amplifiers are needed to provide the same overall gain. The input transformer T1 was homemade with three bifilar windings of five turns of twisted enamelled wire. One of the Mini-Circuits miniature wideband transformers could be used.

Duplex Bell Circuit

Angus Donaldson VK4ABD has provided a simple circuit which has
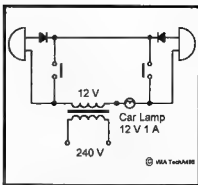
been around for quite a while in various forms. It allows two way signalling using a pair of wires and uses a couple of small bells. I have modified it slightly so that the fuse used to limit current under the simultaneous operation of the push buttons is replaced by a lamp used as a current limiter.

A bell circuit that works from both ends and uses only two connecting wires can be arranged as shown in Fig 4. It is powered from an ordinary bell transformer and uses any two power diodes connected in opposition.

Normally, no current will flow in the opposing diodes. Pressing either button shorts out the local bell and diode. The remote bell then rings on the half wave DC. The lamp limits current in the event of both buttons being simultaneously pressed. The lamp has a low cold resistance and so should not interfere with circuit operation as the bells draw less current than the lamp operating current.

Clo PO Box 2175, Caulfield Junction VIC 3161
RV

WIA News

M Prefix for G Hams

From 1 April, UK amateurs will be allocated call signs with an M prefix as the Radiocommunications Agency is running out of G-series call signs.

The first call sign issued in the new series is M0AAA, awarded to the Reading and District Amateur Radio Club, RADARC, (on behalf of the Reading Novices Amateur

Aerial Association, according to the *ARRL* Letter of 9 February).

RADARC will use MX0AAA, the club version of the call sign, beginning 1 April, and is offering special QSL cards for contacts.

The same prefix pattern for the G-series calls will be followed by the Radiocommunications Agency: MI for Northern Island, MM for Scotland, MW for Wales.

ALARA

Sally Grattidge VK4SHE*, ALARA Publicity Officer

ALARAmeet Update: Perth WA, 28-29 September 1996

The registration form for this event is in the January Newsletter. If you do not have one, this means that either you have lost your newsletter or let your membership lapse. The first can be remedied by contacting the organiser direct, Bev Hebiton VK6DE, PO Box 299, Geraldton, WA 6530; and the second by sending your subscription to our Treasurer, Margaret Schwerin VK4AOE, PO Box 758, Dalby, QLD 4405.

Bev recommends that you do not leave it too late to book accommodation in Perth as it will be school holidays and Royal Show Time. At the last count 26 are definitely going to be there (of which 20 are ALARA members), and 60 have expressed interest, so it looks like being a big meet. Cost, once you get to Perth, is very reasonable, and an interesting and eventful weekend has been planned. The following Monday (30 September) is a public holiday and an extra tour will be arranged, if requested; another reason to get your registration in early. For those who are in Perth on Friday, 27 September, an evening meal will be arranged.

The venue for the meet is the White House in Ferndale, a mansion built in 1888 which is now a function centre. Visits will be made to Kings Park, overlooking the city and Swan River, also to historic and picturesque Fremantle of America's Cup fame. Be there!

Special Event Call

Stay tuned for this one. It was hoped to have VI2IALARA celebrating our 21st birthday, but there are some problems with this. Although it may end up being something different, it is hoped to avoid a state number as ALARA is an Australia-wide organisation. The special call will be run from June until the end of ALARAmeet 1996.

More News from the West

Bev VK6DE and OM Brian visited Norfolk Island last year and recommend a holiday there to anyone who has been thinking about it. Bev was able to meet Kirsti VK9NL and visit her shack (see photograph).

Bev was involved with JOTA as usual last year with Guides and Brownies visiting her shack. Norma VK6PNS operated for JOTA with the Peel Amateur Radio Club. The WA YLs hold

Kirsti VK9NL (seated) and Bev VK6DE in Kirsti's shack.

monthly luncheons, and were pleased to report a visiting YL, June ZL2WE, attending in November, so if you are passing through Perth any time, contact Bev and find out when the next one is happening.

North Queensland

Townsville Amateur Radio Club Ladies net celebrated its seventh birthday in February. Ann VK4MUM has run this net, at 6 pm local time on the 2 m repeater (146.700 MHz) on Wednesday evenings, since it started. If you are in or near Townsville at that time, please call in.

The District Radio Ladies in the Rockhampton area are active as usual and held a Barbecue-in-the-Park in February. Regular nets are held on the first Thursday of the month at 8 pm (local) on 146.900 MHz, then at 8.30 pm on or near 3.565 MHz. Visiting YLs in the area are welcome to join in. Contact is Robyn VK4RL, and the ladies have their own call, VK4DRL.

Deep South

Helene VK7HD sends greetings from Tasmania. Helene and OM Peter spent five months on the mainland last year. They visited their son and daughter-in-law in Victoria where they bought and fitted out a caravan, and presided over the birth of a new grand-daughter, Ann-Marie. They were also able to see Bron VK3DYF at Rosebud, and take part in a caravan towing course before hitting the road.

They took the caravan north up the Newell Highway to Queensland as far as Rockhampton, enjoying the sights and meeting the people. Two weeks were spent at Hervey Bay where they were welcomed by the local radio club and were able to work VI50PEACE on VHF. Helene and Peter have high praise for the Travellers' Net and were impressed by the friendliness and efficiency of the operators. They were back in Victoria in time for Ann-Marie's christening and also visited Mavis VK3KS and Ivor VK3XB before returning home in time for Christmas. Both are "hooked" on caravan travelling so will hopefully be back soon for another trip.

Packet

It is hoped to list members' packet addresses in the Newsletter for quick reference, so if you are on packet (VK or DX) please send your details to Bron, VK3DYF@VK3COL.#MEL.VIC.AUS. OC. If you make use of the packet station of another callsign, include that

information. This list needs to be kept up-to-date, so please notify ALARA promptly of any changes. For an organisation as spread-out as ALARA, packet is a great way to pass information accurately with much saving on stamps and phone calls.

Thelma Souper Memorial Contest 1996

This contest will be held on 13 and 14 April from 0700 to 1000 UTC. All contacts on 80 m, phone and CW. One contact per station each half hour.

Call "CQ WARO CONTEST", and exchange signal report plus serial numbers, commencing at 001. Scoring is one point per contact multiplied by the number of WARO stations and bonus station (ZL2YL) worked. Underline multiplier contacts in log. Logs should include a separate sheet with Callsign, Name, Address, Number of contacts, Number of WARO members, and Score. Enter date at beginning of each evening. Each entry is to contain Time, Callsign, Name, Number sent/received. Logs are to be sent to the Contest Manager, Chris Armstrong ZL1BQW, PO Box 209, Kawerau 3083, New Zealand no later than 11 May 1996 (more details are in the January Newsletter).

c/o PO Woodstock, QLD 4816

ar

of opportunity for listening to the all important telemetry from the "S" mode beacon.

AO-10 Report

I've noticed one or two reports of AO-10 being operational again. Most reports say that signals are still weak and unreliable. We'll probably have to wait another month or so for the "old faithful" to return to reliable operation. It will be interesting to compare received signals with the published "guess-timates" of the current attitude.

Uplink QRM on the Digital Birds

I was reminded the other day of the heady days of 1978 and Oscar-8 when we were confronted with the problems of "J" mode operation. It always seemed that the satellite was very insensitive on the uplink when over Asia to our north. Normally a few watts would suffice on two metres to access the transponder. However, when the satellite came up over our northern horizon 100 watts was insufficient.

Many theories were put forward, such as satellite antenna position, spacecraft attitude, etc. The only reasonable answer was extreme QRM on the two metre uplink. Close listening from a quiet location would reveal a multitude of weak signals usually concentrated at one end of the down link pass band. The non-amateur QRM continued for the life of Oscar-8 and was also audible on later satellites, including AO-13 when its "J" mode transponder was working.

The Jan/Feb 1996 edition of the *AMSAT Journal* features an excellent article by Cliff Ward WA5LVG on his maritime mobile satellite operation. Cliff operates from a large roll-on/roll-off cargo/container ship. The ship does the Pacific run and is often in the South East Asia region. To quote Cliff: *"How well does it work? I get into the satellites quite well except when the footprint includes The Philippines. There, two metre radios are used in taxi cabs and by various businesses, so there is tremendous two metre uplink QRM. Dave W1YRM (on Guam island) has difficulty in getting into the (digital) birds and he is using directional antennas. The satellite's receiver is just overwhelmed".*

Seems nothing much has changed in nearly 20 years! As I've mentioned before in this column, 5-10 watts is enough uplink power for the digital birds. When they come up over the northern horizon, however, 100 watts into a high gain cross-Yagi will often not get a response.

AMSAT Australia

Bill Magnusson VK3JT*

An Interesting Statistic

You can't help noticing that the same call signs keep coming up on the digital birds. This prompted me to keep a log of call signs seen on UO-22, KO-23 and KO-25 over several months. VK2 scored the highest number with 13. VK3 followed not far behind with 11. VK4 was next with seven, followed closely by VK5 and VK6 with six each. Two stations were logged from VK7 whilst VK8 and VK1 had one each. This adds up to the grand total of 47.

I have expressed before in this column how difficult (and expensive) it can be to get up and running on the digital birds, but less than 50 stations Australia wide is a bit poor. I also logged New Zealand stations. ZL1 and ZL2 both had seven. ZL3 came in with four and a lone station was logged from ZL4, making a total of 21.

AO-13 Report

With the impending re-entry of this bird later in the year it will be hard for any satellite operator to ignore its last few months of operation. Let's all make an effort to give AO-13 a good send off. It has drifted into a quite favourable orbit for operators in the southern hemisphere and the final months should provide some of the best operating conditions we have ever experienced.

The provisional transponder schedule for the period 1 Apr to 10 Jun 1996 is as follows:

Mode – B	: MA 0 to MA 70
Mode – BS	: MA 70 to MA 110
Mode – S	: MA 110 to MA 112 (beacon only)
Mode – S	: MA 112 to MA 135
Mode – S	: MA 135 to MA 140 (beacon only)
Mode – BS	: MA 140 to MA 180
Mode – B	: MA 180 to MA 256

The omni antennas will be switched on from MA 230 to MA 25. The attitude will be 180,0 with the move to attitude 220,0 beginning 1 Jun.

As you can see there will be lots of good operating for "S" mode and plenty

The Future of SAREX

Many satellite operators will have taken part in the various SAREX missions that have taken place on board the Space Shuttles. These have varied from highly organised school based contacts to casual voice QSOs with Shuttle Astronauts. SAREX will enter a new exciting phase in 1997 with the start of assembly of the International Space Station (ISS).

The "Habitation Module" is due to be installed in 2002. This will be the start of a permanent human presence on board the ISS. Amateur radio has become such an integral part of Shuttle missions that nearly every Astronaut is a licensed amateur radio operator. When the ISS becomes a reality it appears that a permanent amateur radio station will be part of the equipment. Negotiations are already under way for a permanent, earth pointing antenna system and equipment racks for currently envisaged and future modes including voice, packet and ATV. It is hoped that an external earth pointing camera and fast scan ATV transmitter will give ground based amateurs an "Astronaut's eye" view.

The ISS could eventually challenge the free flying OSCARs as our primary trackable object. Whatever happens, the next few years should be exciting for the amateur radio satellite community.

*359 Williamstown Rd, Yarraville VIC 3013
CompuServe: 100352,3065
BT*

AWARDS

John Kelleher VK3DP — Federal Awards Manager

VK Awards List

In the mail, I often have requests from both here and overseas for a list of VK Awards. Apart from the Federal Awards, there is no such list, and I am left with egg on my face.

I have only to glance around the walls of my shack to notice the number of Radio Clubs who have sponsored "permanent" awards. I hate to repeat myself, but I have tried to raise interest in this situation by offering to publish details of Club sponsored awards in *Amateur Radio*, which is known internationally. At this point, I will go a step further, and offer to accept and collate any and all offerings into a booklet of State awards. My domain is WIA Federal Awards, but with a little help from the States, we could have the answer to the many requests that I have received. Please help.

In the wake of the recently published DXCC listings, I have received letters from interested parties, complaining that their callsign was not present in those listings. For their information, they are kept on the "active" list for 6 years. If, after those six years, they have not added to their DXCC listings, then they are placed in the "inactive" file. If I did not do this, I would have to build an extension onto my already crowded shack.

Worked All Indonesia Award (WAIA)

Issued for contact with stations in each of the Indonesia call areas (1 to 0) as follows:

DX stations, other than those in CQ Zone 28, need two stations in each area.

DX stations in Zone 8 need three stations in each call area.

Modes or bands may be mixed. SWL OK. Contacts after 7 September 1968.

GCR list and $US8.00 or equivalent to: Mr M Maruto YB0TK, PO Box 96, Jakarta 10002, Indonesia.

Cork Radio Club DX Award

Make contact with members of the Cork Radio Club, or EI stations in County Cork. EI/G need four, rest of Europe three, outside Europe, two QSOs.

Any band, any mode. SWL OK. GCR list and $US4.00 to: W O'Reilly EI8AU, Mount Oval, Rochestown, County Cork, Ireland

Worked EI Counties Award

Work (or hear) at least 20 of the following counties after 1 January 1982: Carlow, Cavan, Clare, Cork, Donegal, Dublin, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Limerick, Longford, Louth, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Waterford, Westmeath, and Wexford.

Look for the rarer Irish counties which are activated each St Patrick's Day (17 March) by the IRTS. Amateurs with an Irish ancestry can join IRTS as honorary members. SASE to W2ORA for details.

GCR list and 10 IRCs or equivalent to: IRTS Award Manager, Box 462, Dublin 9, Ireland.

Israel Award

Work Israeli stations to qualify for a necessary 25 points. Each 4X above 10 MHz = one point, below 10 MHz = two points. Each station may be worked only once on each band.

Contacts must be after 1 January 1983. No restrictions on bands or modes. GCR list, plus 7 IRCs or equivalent to: Israel Award Manager, PO Box 4099, 61040 Tel Aviv, Israel.

*PO Box 2175 Caulfield Junction 3161
BT*

Contests

Peter Nesbit VK3APN — Federal Contest Coordinator*

Contest Calendar April-June 1996		
Apr 6/7	SP DX Contest (CW)	(Mar 96)
Apr 6/7	Israel DX Contest	
Apr 12/14	JA DX CW Contest (High Bands)	(Mar 96)
Apr 13/14	International Grid Loc Contest	(Mar 96)
Apr 27/28	Helvetia DX Contest	(Mar 96)
May 4/5	ARI Contest CW/SSB/RTTY	
May 11/12	CQ-M Contest	
May 11/12	Sangster Shield (80 m ZL)	
May 25/26	CQ WPX Contest	(Feb 96)
Jun 3/4	RSGB Field Day CW	
Jun 10/11	ANARTS (VK) RTTY	
Jun 17/18	VK Novice Contest	
Jun 17/18	All Asia CW DX Contest	
Jun 24/25	ARRL Field Day	

This month's column contains the results of the VK/ZL/Oceania DX Contest. During the log checking process, it struck me that nearly all 160 m QSOs were with other local stations, or between VK and ZL. Several stations worked FK8, but no other DX was worked on that band. In the comments accompanying the logs, many VK and ZL entrants complained about the lack of activity on 160 m, and the fact that most of their CQs went unanswered. I don't think it was lack of effort on their part; in fact, many of these comments revealed a definite fondness for 160 m, tempered with a frustration that they didn't do as well there as they felt they should have.

This made me think about the effect on the contest overall. The logs of most of the top running operators showed that, despite spending a significant amount of time on 160 m, typically only a few QSOs resulted. Looking at it objectively, the amount of time spent there was out of all proportion to the number of QSOs which resulted and, furthermore, the band mainly yielded local multipliers, not DX ones.

This is not a desirable situation, because time spent on 160 m is time not spent on other bands, where DX is much more easily worked. If 160 m were to be dropped from the contest, there would be more VKs and ZLs on other bands, which would stimulate more DX activity.

The inclusion of this band seems to achieve very little in the way of DX, yet it creates a significant nuisance for entrants. In discussing these thoughts with one top contester, it turns out that he, and others, share similar sentiments.

One could argue that the demands of juggling precious time between 160 m and the other bands, in order to get a few more multipliers, is a good test of operator judgement. This would be well and good if DX was more readily workable on the band, or if VK/ZL activity was higher. However, the reality is otherwise, and the contest is poorer as a result. I think it's time to stop fooling ourselves that working stations in the next suburb is an adequate substitute for DX, and face the fact that the acceptance of such QSOs is little more than a kludge (largely unsuccessful) to stop operators falling asleep on 160 m due to boredom.

My proposal is therefore to drop 160 m from future VK/ZL/Oceania DX Contests, to allow entrants to focus more fully on the higher bands, and stimulate DX activity. This would also even things up for the majority of entrants who do not have large blocks of land and huge 160 m antennas. To compensate for the loss of 160 m, I strongly believe that a separate contest for 160 m probably should be introduced for VK, ZL and Oceania amateurs, perhaps managed similarly to the VK/ZL/Oceania Contest. Many years ago the WIA ran such a contest, which was extremely popular but, unfortunately, it only ran once. Perhaps it's time to revive it.

One might argue that there are already three 160 m DX contests, so why introduce a fourth? Well, two of them are US contests, and the third is European. Whilst I know some hopeful VKs listen in, QSOs are extremely difficult, not only due to our extreme distance (in 160 m terms), but also the enormous QRM which we have to break through to obtain QSOs. If anyone needs convincing of the difficulties, one need look no further than the results of those contests, which rarely show a VK callsign.

What do you think? The first step is to identify the best time of the year for the proposed 160 m contest, what the overall objectives should be, and whether anyone is interested in managing it. Any and all suggestions are invited, and I look forward to hearing from you soon.

Thanks to VK3KWA for the results of the Ross Hull and VHF/UHF Field Day contests. As you see, the column is already packed, so entrants will have to wait in suspense until next month, to discover if they won!

73,
Peter VK3APN

ARI International DX Contest
CW/SSB/RTTY

2000z Sat to 2000z Sun, 4/5 May

This contest occurs each year on the first full weekend of May. Anyone can work anyone else, and categories are single operator CW, SSB, RTTY or mixed, multi-operator single transmitter mixed; and SWL mixed. Bands are 160-10 m (no WARC). The same station can be worked on the same band once each on CW, SSB, and RTTY, but the multiplier can be claimed only once for that band. Once a band or mode has been used, 10 minutes must elapse before it can be changed. Send RS(T) plus serial number; Italian stations will send RS(T) plus province.

Score 10 points per Italian QSO, three points per QSO with stations in another continent, one point per QSO with stations in own continent, and zero points per QSO with stations in own country. Final score equals total points from all bands times total multipliers from all bands.

Multipliers are the sum of Italian provinces (max 103) and countries (excluding 1 and I50) on each band. Province codes inside: I1: AL AT BI CN GE IM NO SP SV TO VB VC; IX1: AO; I2: BG BS CO CR LE LO MI MN PV SO VA; I3: BL PD RO TV VE VR VI; IN3: BZ TN; IV3: GO PN TS UD; I4: BO FE FO MO PR PC RA RE; I5: AR FI GR LI LU MS PI PT SI; I6: AN AP AQ CH MC PS PE TE; I7: BA BR FG LE MT TA; I8: AV BN CB CE CZ CS IS KR NA PZ RC SA VV; IT9: CL CT EN ME PA RG SR TP AG; I0: FR LT PG RI ROMA/RM TR VT; IS0: CA NU SS OR.

Use a separate log for each band, and a check log (ie sorted callsign list) for 100+ QSOs on any band. Send log to Award Manager I2UIY, PO Box 14, 27043 Broni (PV), Italy. Logs on disk are welcome, and an MS-DOS logging program is available from the contest manager for $US5.00 (to cover disk/postage).

CQ-M Contest (CW, Phone, Mixed)

000z Sat to 2100z Sun, 11/12 May

Sponsored by the Krenkel Central Radio Club, this contest runs on the second full weekend of May each year. Categories are single operator, single and all band; multioperator single transmitter; 20 m SSTV, SWL. Bands are 160-10 m. No cross-mode QSOs please. Call "CQ-M", and exchange RS(T) (or RSV on SSTV) plus serial number. Score one point per QSO with own

country, two points with a different country in the same continent, and three points with other continents (continents as for WAC) The final score equals total points times total number of countries from each band.

Countres are according to the R-150-C list, which is similar to the ARRL DXCC list except for former USSR countries. Serious competitors should review the R-150-C list. Awards apply, and there are achievement awards for stations making 200+ QSOs. Mail logs by 1 July to: Krenkel Central Radio Club, QC M Contest Committee, Box 88, Moscow, Russia.

Sangster Shield

0800-1100z Sat & 0800z-1100z Sun, 11/12 May

This unusual contest emphasises low power operation. Work ZLs on 80 m by 12 May. QSOs can be repeated once per 1/2 hour period, ie 0800-0830, 0830-0900, etc. At least five minutes must elapse between repeat QSOs with the same station, or else another station must be worked in between. Send RST plus power output; ZLs will send RST/branch/power. Non-ZLs using up to 5 W score 10 points per QSO with a ZL, if the ZL worked is using up to 5 W; or five points per ZL using over 5 W. Non-ZLs using more than 5 W score five points per QSO with a ZL using up to 5 W. QSOs between stations where both use more than 5 W are invalid for the contest. Final score equals total points times number of ZL branches worked. Send logs to reach: Contest Manager ZL3KR, 4 Exton Street, Christchurch 8001, by 8 June. Certificates will be awarded to the highest scoring non-ZLs in their respective call areas.

the need to copy callsigns and numbers accurately as well, to avoid the loss of QSO points and multipliers. In several cases, where scores were close, the battle for country and continental leadership was, in fact, decided according to which entrant made the fewest errors.

As usual, a number of check logs were received. I don't fully understand why entrants would go to the considerable trouble of preparing and posting their logs, without spending the minute amount of extra time and effort to work out the score. Lack of current rules should not be an obstacle, because most contest managers (myself included) will readily score logs without penalty, unless it's a huge one (which is rare). In fact, many such entrants did themselves an injustice, because their logs were good enough to make them country and even continental leader! Therefore, these winning logs were promoted to full entries, and the entrants concerned should be delighted to find that they have received a certificate for their efforts.

The standard of logs continues to increase, with many now coming in the form of computer printouts and floppy disks. To those entrants who do not have access to a computer, I hasten to add that many top scoring logs were hand produced, so the lack of a computer is not necessarily a handicap.

A brief warning to those who send logs on disk. One disk was received partially bent, and had to be removed from its sleeve and inserted into a new one before it could be read. Another disk was received with bad blocks in the middle of the data, and had to be revived using Norton's

Disk Doctor. Fortunately, enough data survived for the log to be usable. For the sake of your log, please use good quality disks (preferably 3½"), and/or include a paper backup. We are working towards getting a BBS number and/or Web page on the Internet for contest logs, which should resolve the problem in future.

Several entrants commented on the apparent lack of Pacific activity. Whilst only two Pacific area logs were received (from DU1 and KC6), a quick scan of logs shows plenty of Pacific prefixes in evidence. So, if you didn't work them, perhaps you weren't listening hard enough! And yes, we do publicise the contest widely.

Some outstanding scores were achieved, with special mention going to John Loftus VK4EMM for being the inaugural winner of the Frank Hine VK2QL Memorial Trophy, for the highest CW score. Not content with CW, John joined forces with Peter NN9K/VK4CWX to take out top phone multi-operator for VK, ahead of stiff competition from Martin VK5GN, assisted by VK5AI. Overseas, Nobuo JA6GCE put in an outstanding effort on both phone and CW, despite being beaten by a whisker on CW by Takeshi JA3AAW. I won't individually detail the remaining winners, except to congratulate them and refer you to their scores below.

The next VK/ZL/Oceania DX Contest will be sponsored by NZART, so please give it your full support.

73s, and I look forward to seeing you in our next contest!

Peter VK3APN

Results of 1995 VK/ZL/Oceania DX Contest

Frank Hine Memorial Trophy (Highest CW Score)

John Loftus VK4EMM, 2,440,370 pts

Continental Leaders

Continent	Single Operator		Multi-operator		SWL	
	CW	Phone	CW	Phone	CW	Phone
Oceania	VK4EMM	VK4MZ	—	VK4EMM	—	—
Africa	EA8CN	—	—	—	—	—
Asia	JA3AAW	JA6GCE	RKOQ	RKOQ	JA4-4665/1	JA4-4665/1
Europe	SP5CIQ	G3NAS	UU5J	UU5J	OM3-27707	ONL-383
North America	K2SX/1	W5FO	—	—	—	—
South America	YV1OB	—	—	—	—	—

Country Leaders (Single Operator)

Country	CW	Phone	COUNTRY	CW	Phone
Oceania					
Australia	VK4EMM	VK4MZ	Rep. of Palau	KC6HN	—
New Zealand	ZL1AIZ	ZL4NF	Philippines	—	DU1SAN
Africa					
Canary Isl.	EA8CN	—			
Asia					
Asiatic Russia	UAOLCZ	RAOFU	Taiwan	—	BV2FI
Japan	JA3AAW	JA6GCE			
Europe					
Aaland Island	OHO/OH3TY	—	Italy	—	IK4SWX
Belarus	EW2AA	EW2AA	Lithuania	LY3JY	LY1FW
Bulgaria	LZ1LZ	LZ1XQ	Moldova	ER1OA	—
Czech Republic	OK2EQ	—	Netherlands	PAOCYN	PA3EPN
Denmark	OZ5DX	OZ5KG	Norway	—	LA9JDA
England	G3GLL	G3NAS	Poland	SP5CIQ	SP7VCK
Eur. Russia	RA3XO	RU6BV	Slovakia	OM6KW	OM6KW
Finland	OH6IU	—	Spain	EA1AUI	—
Germany	DL6YK	DL1JPL	Sweden	SMONJO	—
Greece	—	SV2AVP	Switzerland	HB9ADD	
Hungary	HAOEQ	—	Ukraine	UX7I	UR3I
Iceland	TF3DX		Yugoslavia	YU7SF	—

Country Leaders (Multi-operator)

Australia		VK4EMM	
Asiatic Russia	RKOQ	RKOQ	
Eur Russia	RZ4AYT	RZ4AYT	
Japan	JA2YKA	JA1YAO	
Ukraine	UU5J	UU5J	

CW Results

Callsign	Band	160	80	40	20	15	10	Score
Single Operator								
Australia								
VK1FF	40		312285					312,285
VK1FF	A							845
VK2APK *	A	120	47560	357304	48841	19092	504	1,660,531
VK2BQQ	80		27720					27,720
VK2DID			37370	675	900			68,094
VK2PS	A	240	1760	5580	15680	11792		158,760
VK2VM	A	120	22960	10800				73,870
VK2ZC	A		6460	21375	6279	6440		180,686
VK3APN	A		14570			8		15,642
VK3DXI	20				69225			69,225
VK3KS	A			80	110	608		2,070
VK3KB	A		40	4080	240	988		15,480
VK4EMM	A		15480	1105845	27824	27824	4050	2,440,370
VK4TT	20			44385				44,385
VK4XA	10						10296	10,296
VK5AGX	40			8750				8,750
VK5AI *	40		30485					30,485
VK5GN	A	20	33120	40180	30058	22950	1980	662,355
VK6AJ	A	40		150	2880	3800	27	20,739
VK6IV	40			39200				39,200
VK8AN/4/8	15					2052		2,052
New Zealand								
ZL1AIZ	A	300	57850	187880	9408	6834		876,792
ZL1ALZ	A	80		11340				11,340
ZL1HV	A	40			46000			46,000
ZL1MH	A	40		46610	2992	9976	192	166,934
ZL1RAW	A		320	1800	9			4,573
ZL2AGY	80		104520					104,520
ZL2CD	A			10965	15000	7344		106,506
ZL2VS	A	20			2438			2,438
ZL3NB	A		2730	251810				309,400
ZL4OI	40			93790				93,790

Phone Results

Callsign	Band	160	80	40	20	15	10	Score
Single Operator								
Australia								
VK2ARJ	A	80	1540	6630	26875	126		120,400
VK2PS	A	800	3080	1200	22581	5796		161,690
VK2QG	A		7700	13005	19261	12028		234,668
VK2XT	A		4680	19500	9675	91392		433,810
VK3DXI	20				25422			25,422
VK4MZ	A	900	19040	49980	6120	32936	1953	570,304
VK5OF	A				169			169
VK6WJH	A	120	5520	1785	7140	10904		145,485
New Zealand								
ZL1BVK	A	1820	3960		486	4130		52,920
ZL1RGR	A		1980	1105	9			7,700
ZL3TX	A	500	41160	3120	144	60		105,230
ZL4NF	A	80	1280	16470	3927	23798		170,704

Multi-operator

Callsign	Band	160	80	40	20	15	10	Score
Australia								
VK1DX		800	6560	3840	43955	14632		322,816
VK4EMM		1000	2700	26975	25132	47124	11088	628,140
VK5GN		480	18620	29480	27306	22052	12	485,408

VK Comments

Full comments and all contestants' scores (not just for VK and ZL) will appear in the Results Booklet.

CW: Doubled my score from last year, and had a good time. A couple of good openings to Europe.. VK1FF I had to work Sunday, so could only devote a few hours to the contest. This was my first CW contest, and I learnt a lot. An electronic keyer would be very luxurious. VK1IE. We live in a retirement village where no masts are permitted, so our antenna is merely 38' of wire slung over the roof... VK3XB & XYL VK3KS. Pleased with the good level of participation on 40 m from Europe, Asia and North America. 10 m and 15 m were wide open to Asia/Pacific, but few stations were active. Got no response to my 160 m calls. Looking forward to another big effort next year . VK4EMM. Have been having a rough test lately: Had a heart attack in August, and then a triple bypass in October. These heart attacks sure interfere with my contesting... VK4TT. Only a few European QSOs on Saturday, and none on Sunday. Enjoyed the struggle... VK5AGX. My first VK/ZL; I enjoyed my first ever CW pile-ups in 42 years of ham radio. VK5AI. Although my CW is improving, a year ago I was lucky to read 12 wpm, so the pile-ups are still challenging! Enjoyed myself, lots of good DX, great fun... VK5GN. The lack of sunspots made it hard to penetrate with QRP and my 10' copper pipe antenna... VK6AV?

Phone: Lots of fun, a real Pandora's box!... VK2ARJ. Not enough participation from our side. Do the Pacific countries know they can participate? Do they have advance notification, and is there any VK/ZL plan to encourage more Pacific activity?... VK2PS (Agree; yes; yes. ZL1AAS and I have discussed it often, but it's easier said than done — Peter VK3APN) We had a great time checking out a new antenna farm. The only drama was when the local rattle started chewing the coax! A good opening to Europe on 20 m, but condx were difficult on the lower bands, with high QRN... VK4EMM. Special thanks to the contest manager and all participants. VK4MZ. We had some clock problems with two ops and RFI in the computer. I think the points for 160/80/40 are too high, which puts the average suburban station at a disadvantage compared to those on a few acres. Seems silly that a VK3 on 160 is worth almost 7 times a JA on 10!... VK5GN. Conditions here very poor, also QRM from an EA contest... VK5OE. Enjoyed it very much Some DX openings, although propagation poor I would have liked more 160 m QSOs, but there were none to be had VK6WJH.

*PO Box 2175, Caulfield Junction, VIC 3175

ar

Club Corner

Riverland Radio Club Inc
Communications 96

"Communications 96" is the theme which will be sponsored by the Riverland Radio Club, with support from the South Australian Division of the WIA, on Saturday, 27 April 1996 in the K M Tucker pavilion at the Renmark Show grounds, Renmark.

"Communications 96" will be endeavouring to emphasise all facets of the latest technology in communications such as radio communications, satellite communications, mobile phones, computers, bulletin boards, Internet, packet radio and electronics.

Commercial interests involved in "Communications 96" include Daycom Communications, Hills Industries, ZRV Communications, Mike Iredale Communications, Johnston Electronics, ATN Antennas, Gardners, Riverland Computers and A-OK Communications.

Buy and sell stalls will be available to dispose of that unwanted radio and electronic equipment — book your stalls early. There will also be some excellent craft stalls for the ladies, as well as morning and afternoon teas, and lunch available. A dinner will be held in the Renmark Hotel at 6.30 pm, with a three course dinner costing only $18 per head. Bookings are essential.

For bookings and more information, contact the Riverland Radio club secretary, Doug Tamblyn VK5GA at Box 646, Renmark SA 5341, or by phone on 085 955 320.

Radio Amateurs Old Timers Club (RAOTC)
Annual Meeting

The RAOTC Annual Meeting and election of office bearers was held at the Bentleigh Club on Wednesday, 6 March. The previous committee was re-elected, with the addition of Stewart Day VK3ESD after the meeting voted to increase committee members from five to six.

The seventy members and friends present listened with close attention to a talk about the top secret work of the RAAF "Wireless Units" during the war in the Pacific. Our speaker, Jack Bleakley, was one of the specially trained operators who had to master the 70 character Japanese Kana code and monitor Japanese military traffic.

Jack was in the first RAAF unit that General MacArthur took with him to the historic landing at Leyte in the Philippines and on to Manila.

Jack's book, *The Eavesdroppers*, was only allowed to be published in 1992 and has been sold out. Hopefully, it will be reprinted about the middle of this year.

Broadcasts

With the end of Daylight Saving in the eastern states, our monthly broadcasts will be at 1200z, 0100z, 0200z and 1030z.

Allan Doble VK3AMD

active in particular aspects of Divisional affairs, but are not necessarily on the committee. These include those concerned with building and maintaining Canberra's repeaters, running education classes, JOTA, and the Outwards QSL Bureau, to name a few activities performed by them.

Committee Seeks Ideas at February's Meeting

Immediately after the AGM, a regular meeting was held. The first item on the agenda was a vote of thanks to the outgoing President, Rob VK1KRA, Secretary, Len VK1NLJ, and Treasurer, Alex VK1AC. Members present raised a variety of topics, including the need for a 1200 baud packet repeater. There was also some discussion on the optimum number of VHF/UHF amateur repeaters for Canberra; most who spoke thought that we had about the right number at the moment. As well, there was support for the Division to hold social functions as well as formal meetings.

The new committee is receptive to your ideas about how the Division can serve the membership better. If there is any matter that you would like to discuss, please phone the President, Phil VK1PJ, on 292 3260.

Repeater Committee's Weekly Meetings

A reminder that the VK1 Repeater Committee meets at 7 pm each Thursday at the Communications Laboratory, 14 Wales Street, Belconnen. For further information, contact Neil VK1KNP at home on 258 7803.

Still on repeater news, local amateurs will have noticed the improvement to the performance of the Black Hill 6900 Repeater during January, due to the fitting of a new antenna. More recently, coverage of the temporary Mt Ginini repeater was enhanced, again because of the Repeater Committee's work. Winter comes sooner than you think at Mt Ginini, and snow will soon be falling on the site of Australia's second highest amateur repeater, making it inaccessible. For this reason, the replacement of the existing temporary repeater is unlikely before Spring.

Correction

February's *Forward Bias* carried an item regarding a local amateur whose packet radio station had been jammed on transmit for some time before being discovered. The story stated that the problem was due to a packet watchdog

Divisional Notes

Peter Parker VK1PK

Divisional AGM Well Attended

More than 40 members attended the VK1 Divisional AGM, held at the Griffin Centre on Monday, 26 February. As the number of people seeking office equalled the number of positions, no election was required. Nevertheless, with last year's President, Secretary and Treasurer not standing in 1996, there has been a large infusion of new blood into this year's committee; seven of its eleven members are new this year.

Your Divisional Committee for 1996 consists of President, Phil Rayner VK1PJ; Vice President, Ian Cowan VK1BG; Secretary, John Woolner VK1ZAO; Treasurer, Bernie Kobier VK1KOX; and Federal Councillor, Richard Jenkins VK1RJ.

In addition, the councillors are Hugh Blemings VK1YYZ; Gil Hughes VK1GH; Jim Muller VK1FF (Inwards QSL Bureau Manager); Peter Parker VK1PK (Broadcast and Publicity Officer); Graham Trainor VK1KGT; and Simon Trotter VK1KFC.

As well, several local amateurs are

timer that had failed. This statement was wrong. Instead, the fault was due to the relay in the transmitter concerned becoming stuck in the transmit position. The packet TNC's watchdog timer was operational at the time; however, as the fault was within the transceiver, the TNC would not have been able to shut down the transmitter. I apologise for any confusion or ill feeling that might have arisen from the story. Nevertheless, the basic theme of the item still stands; those who leave transmitting equipment operating in unattended mode owe it to their fellow amateurs to ensure that their equipment is reliable, and (preferably) fitted with a device that shuts down the transmitter after 10 minutes or so of continuous operation.

VK2 Notes

Richard Murnane VK2SKY

Divisional Membership Drive

In accordance with a Council resolution taken at the meeting in Tamworth in February, a new membership drive was commenced at the Wyong Field Day. The first stage of the promotion was that anyone who joined the VK2 Division at the Field Day went into a draw, the prize being $100 cash plus a refund of this year's membership fee. As a result, the Division gained 13 new members at the Field Day.

The second stage of the promotion has commenced, and the prize (generously donated by Cesar Miranda VK2TCM) is the "King of Word Processors", Word Perfect 6.1 for Windows. It's fully compatible with Windows 95 and carries a $565 price tag in most computer stores.

Who can Enter?

The promotion is open to all new members (in any category) who join the WIA (VK2 Division) from now until the Division's Annual General Meeting on 20 April 1996. The winner will be drawn at the AGM, and will be available for collection on the day. The lucky member will be announced on the Divisional broadcast, packet radio network, and in *Amateur Radio* magazine.

WIA membership nomination forms are available from the Divisional Office, or by contacting the Membership Secretary, Cesar Miranda VK2TCM, on (02) 831-8450, or by fax on (02) 621 1516.

Thought for the Month: The trouble with most of us is that we would rather be ruined by praise than saved by criticism.

VK3 Notes

Jim Linton VK3PC

Closing Date — Motions on Notice

The closing date for motions on notice for the 1996 Annual General Meeting of the WIA Victorian Division is 12 pm on Thursday, 18 April 1996. Motions must be lodged with the Secretary by the closing time, and be signed by three financial members.

Council Election and AGM

The WIA Victorian Division AGM will be held at St Michaels Community Centre, Ashburton, on the evening of Wednesday, 29 May. Formal notification of the AGM and the necessary forms for the election of the 1996/97 council will be sent to all members.

The 1995 company report, which includes the balance sheet and auditors report, will not be distributed in *Amateur Radio* magazine this year as it has in the past. This report, together with ballot papers and any notices of motion, will be mailed directly to financial members.

All members who wish to vote in the forthcoming election should ensure they remain financial at all times. When material is posted to members, records must be researched up to ten days prior to mailing in order to produce the address labels. Members who are not currently financial at this time will be excluded from any posting.

Financial members will receive, by mail, one only ballot paper for election of councils. No additional or duplicates will be available.

New Federal Councillor

The WIA Victoria Council has appointed Brenda Edmonds VK3KT as Federal Councillor. Brenda had volunteered to take on this role, and her first task will be attendance at the WIA Federal Convention (AGM) next month.

She is very familiar with the workings of the WIA Federation, having been long involved in that scene in several capacities, notably as Education Officer.

Victoria's representation on the Federal level also includes alternate Federal Councillors, Barry Wilton VK3XV and Jim Linton VK3PC.

Special Projects Fund — Reminder

Time is running out for requests for financial assistance from affiliated clubs or individual members for projects of general benefit to members and our hobby.

In these notes last month and on the VK3BWI twice monthly broadcast, members were advised about limited funding being available. Each application has to meet special criteria, a copy of which is available on request.

Applications close on May 30, 1996, and will be evaluated by the 1996-97 WIA Victoria Council.

Submission to Parliament

An exposure draft of the WIA submission on licensing for the Amateur Radio Service to the 38th parliament was released in late February. It was sent to the 200-odd candidates who contested the 2 March federal election, and sitting members of the Senate.

A copy has been sent to each of the radio clubs affiliated with WIA Victoria. Individual members may obtain a copy on request and by forwarding a self addressed A4 envelope to the Secretary.

Clubs or individual members wishing to comment on the draft submission should do so in writing to the WIA Victoria Secretary. The deadline is 12 April.

Melbourne DX Packet Cluster

Alerting DXers on activity of interest to them and providing a useful on-air database resource is the basic task of a DX Packet Cluster. The Melbourne Cluster operating under the callsign VK3UR can be accessed on 144.850 MHz by 1200 baud packet.

Its operation is similar to a packet BBS; however, its main aim is to log and alert users about DX stations. Currently sharing DX information on the cluster are 32 users. The DX listed includes HF, satellite, and terrestrial VHF/UHF DX paths.

Users can stay logged on to be alerted by fellow users of DX activity — a beeping sound is emitted by their PC; or they can review the current list of callsigns, times and frequencies of previous DX SPOTS.

Messages for SYS OP, Tony Burt VK3TZ, can be put on the cluster by using normal BBS mail commands sent to VK3UR on the cluster frequency.

Users having access difficulty may like to try to node hop to VK3IRW-2 which has an output port feeding the cluster, or simply packet message Tony VK3TZ at VK3ECC and he'll respond to your queries.

Novice Licence Conditions

Some Novice and Novice Limited licensees have been heard using the FM voice mode on their digital modes

segment of 144.700 to 145.200 MHz. This is not permitted under the Regulations and the Technical Licence Specifications.

Novices must confine themselves to digital modes such as RTTY or packet in this lower segment of the two metre band. FM telephony for Novices is above 146 MHz only. Also, a reminder about avoiding the use of 146.000 MHz for FM, because it does interfere with amateur satellites.

If an FM station operates on 146.000 MHz, half of its bandwidth will be inside the satellite band. The lowest FM channel in the band plan is 146.025 MHz.

VK6 Notes

John R Morgan VK6NT

Annual General Meeting

The VK6 Division's AGM will be held on 30 April 1995 at the Westrail Centre, East Perth, following the General Meeting that starts at 8 pm. For more detail, please refer to the "VK6 Notes" in the February 1996 issue of *Amateur Radio*.

Monthly Meetings

For 1996, the Wireless Institute of Australia (WA Division) has changed its General Meetings to the LAST TUESDAY of the month. This has been necessitated by a room-booking problem. If in doubt, listen to the weekly VK6WIA News Broadcasts, or telephone the Secretary on (09) 351-8873.

These meetings are held in the Theatrette on the second floor of the Westrail Centre, East Perth, commencing at 8 pm. All interested persons (members and non-members, licensed or listener) will be made welcome. Free coffee and biscuits are available at "half time".

The change in meeting-dates also means that the monthly meetings of Council have been relocated to the library of the Medical Physics Department at the Royal Perth Hospital. For directions, contact Bruce Hedland-Thomas VK6OB on (09) 224-2267 during working hours.

VK6 QSL Bureau

The VK6 QSL Bureau is now a by-mail-only service, as is the case with all other Divisions. To receive their inward cards, members should send a few stamped self-addressed envelopes to: VK6 QSL Bureau, PO Box F319, Perth WA 6001. The same address is valid for out-going cards, and for the purchase of their required stickers. Arrangements are being made for stickers also to be on sale at the monthly meetings.

February General Meeting

More than 50 members attended the January GM, and voted 10-to-1 in favour of continuing the monthly meetings. At the February GM, only four weeks later, it was disappointing to observe that the attendance had returned to its previous level of being only just above the quorum of 25.

The lecture was by Bob VK6PO, and was simply entitled "Fuses". This is one of those topics about which the average amateur operator tends to think that he or she is already sufficiently knowledgeable. With well-structured examples, and many transparencies for the over-head projector, Bob proceeded to destroy any such self-deceptions! At the conclusion of his most-successful presentation, while Bob was answering numerous questions from the floor, it became clear that a follow-on lecture, entitled "Circuit Breakers", should it occur, will surely be similarly informative.

The business meeting followed, and included a few previously-agreed procedural innovations. First, the minutes and correspondence were circulated in written form, rather than being read out. Second, those members of Council who were present were seated on the stage, facing the members. The consequential increased interaction was most noticeable. Only one member of Council refused to participate.

Morse Beacon VK6ROW

The purpose of this system is to provide a continuous source of Morse-code text (sent at between three and 12 wpm) so that prospective radio amateurs, and licensed radio amateurs trying to upgrade, can practice their receiving skill, at any time of the day or night.

The system's format is based on an hourly cycle, which is divided into twelve five-minute segments. The speed (wpm) of each segment is as per the face of an analogue clock; for example, at 35 minutes past the hour, when the minute-hand is pointing to the digit 7, the seven wpm segment will begin. The only exceptions to this rule are at five and 10 minutes past the hour — these segments are at five and 10 wpm (the NAOCP and AOCP examination speeds).

The text of each segment is transmitted using a different audio pitch, which is also chosen at random from the computer's software. This feature is included so that your "ear" will not become attuned to one particular pitch.

The system is located in the Welshpool industrial area, and transmits on 147.375

29

MHz FM, using a WIA-funded Philips TX-814 transmitter which feeds 25 W to a folded dipole at 42 m AGL. Thanks to Air Group Australia for permission to use the site at no charge.

The system has recently been completely re-designed and re-built, and now uses a Motorola 6805 micro-controller, which is capable of driving the planned parallel output in the 80 m band, so that the system will reach beyond the metro area.

If You Have Material ...

All material for inclusion in this column must arrive on or before the first day of the month preceding publication. Packet mail may be sent to VK6NT@VK6ZSE.#PER.#WA.AUS.OC, or write to PO Box 169, Kalamunda WA 6076, or telephone (09) 291-8275 any time.

"QRM" News from the Tasmanian Division

Robin L Harwood VK7RH

During the month of February, Annual General Meetings were held in the three branches. The Southern and Northwestern branches saw no alteration and the executive officers were returned. However, there were some changes in personnel in ex-officio positions, as can be expected. The Southern Branch president is Andrew Dixon, VK7GL; secretary is John Bates VK7RT; and treasurer is Mike Jenner VK7FB. The Northwestern Branch also saw the re-election of David Spicer VK7ZDJ as president; Ron Churcher VK7RN as secretary; and Phil Harbeck VK7PU as treasurer.

The Northern Branch had a complete turnover in positions. The new president is John Cornish VK7KJC; secretary is Anthony Cordwell VK7ZAC; and treasurer is Ian Hart VK7KIH. Instead of electing or appointing ex-officio positions, the branch president recommended that sub-committees be established to do the work previously done by these ex-officio positions. A decision was to be taken at the March meeting on the formation of these committees.

The Divisional Annual General Meeting was held on Saturday, 23 March in Hobart. There were 15 candidates for the eight positions on Divisional Council, which must be a record number. Results will appear in the May edition of *Amateur Radio*. There was a Notice of Motion from the Honorary Solicitor, Mr P Corby VK7ZAX, for the Articles of Association to be amended and updated

to bring them into the 21st Century. Results of this will also appear in this column.

Tom Moffatt VK7TM is well known to many in the state and beyond through his writing. Division has been advised that he has moved to Washington State. We wish him well.

Congratulations go to Don Hopper VK7NN who was awarded the Order of Australia (OAM) in the Australia Day Honours, for emergency communications. He was NCS for many years of the VK Maritime Mobile Net, whilst resident in VK4. The OAM was specifically awarded for his work in amateur radio emergency communications. As a sidelight, it was Don who was one of the radio instructors at the RAAF wireless training school at Ballarat in WW2. One of those he trained was my father and my maternal uncle, who met and became friends at that particular school. My uncle was killed in the War and after the War ended, my father came over to Tasmania, met my uncle's family and married his younger sister, who is my

mother. It really is a small world with Don being in the same Probus club as my father.

Don't forget the Sunday morning broadcast of VK7WI at 0930 EAST (2330 UT Saturdays) on the main two metre repeaters, and re-broadcast on 3570, 7080, 7090 and 14130 kHz. A 144.15 MHz SSB relay has been re-instituted, being provided by Frank VK7ZFT, who is at Arthurs Lake in the Central Highlands. From that high point he is able to reach a wide area of the State and, I am certain, welcomes reports of the 144.15 MHz signal.

Branch meetings for this month are in the South on 3 April at the Domain Activity Centre at 2000 hours; in the Northwest on Tuesday, 9 April at 1945 at the Penguin High School; and in the North on Wednesday, 10 April, again in the staff common room at 1930 hrs at St Patrick's College, Mount Leslie Road, Prospect.

That is all for April. Have a happy Easter and drive safely.

ar

Education Notes

Brenda M Edmonds VK3KT Federal Education Coordinator

It is now some time since I last reported on the progress of the **Question Bank Committee**, which has been working on revision of the theory syllabuses and the review and extension of the Question Banks from which theory examinations are drawn.

When the WIA agreed to manage the examinations, the then DoTC passed over the Question Banks which had been in use. These were the same as those which were released to potential examiners under the original devolved examination system. A number of questions were added to those banks from WIA sources, and examination papers have been drawn from the extended bank ever since. However, even the extended banks were limited in scope and unbalanced in terms of emphasis on syllabus topics.

Over the last three years, the Question Bank Committee has extended and balanced all the Banks, and has reviewed and revised the syllabuses.

We started by changing the order of the Sections in the AOCP/AOLCP syllabus to align it with the Novice syllabus. (Incidentally, I have suggested to the SMA that we start using the terms "Advanced" for the AOCP/AOLCP

AOICP syllabus and "Novice" for the NAOCP/NAOLCP. Any comments?)

The content of the Advanced syllabus was not greatly extended, except for a re-write of the Interference Section. It was difficult to allow for the enormous advances in the field since the last syllabus review (1984) without raising the standard of the examination. There was not much that could be removed to compensate! However, we were conscious of this difficulty, and tried to allow for it by adjusting the standard of the questions.

It was necessary, though, to extend the Novice syllabus because of the increase in Novice privileges over the years. Admittedly it was extended slightly when Novices gained access to two metres, but they now have 70 cm and data modes as well. Again, we tried to compensate by adjusting the question standard.

In addition, at the request of the SMA, we produced a syllabus for the Regulations examination.

All three syllabuses are currently being considered by the SMA, and negotiations are proceeding. We expect to reach a final agreement very soon. Two matters are of concern to the SMA — that there should

not be changes which affect existing reciprocal agreements, and that our syllabuses line up with the European CEPT Harmonised licence proposals to facilitate negotiations on CEPT accreditation for Australian amateurs.

The Advanced Question Bank and the Regulations Bank are also awaiting approval from the SMA, and the Novice Bank is nearly ready for submission. When approval is received the Banks will be released for distribution to examiners, class instructors and candidates. They will then be put into use for the preparation of examination papers. In my next column, I will explain the

structure of the banks and how papers are generated.

In conclusion, let me assure all candidates that there have been no changes made as yet to either the syllabuses or the Question Banks from which examination papers are currently drawn. When the time comes, there will be plenty of publicity to warn all concerned, and time will be allowed for an efficient change-over. Perhaps all those out there who are thinking about sitting for theory or regulations should make the attempt quickly, before the revisions are put into place!

PO Box 445, Blackburn VIC 3130

Casier ON6TT, assisted by Ralph Fedor K0IR, Bob Fabry N6EK and Carlos Nascimento NP4IW. The expedition is planned to depart from Reunion Island, off the east coast of Africa, on 3 January 1997. Operations will commence on Heard Island on 12 January, and end on 28 January, with the team returning to Reunion on 5 February. The total time away for the team members will be exactly five weeks.

The organisers of the expedition have successfully negotiated an agreement with the French Institute of Polar Research and Technology (IFRTP) for a return passage aboard their brand new 120 metre supply vessel, the "Marion Dufrese", which has 10,380 tons of displacement, 4900 tons of deadweight and a cruising speed of 15.7 knots. It has a crew of 25 and can carry 110 passengers in 59 cabins. The ship was specially built to supply and service the French sub-antarctic islands (Crozet, Amsterdam and Kerguelen), and can sail and work under any weather conditions in polar seas. It has the most sophisticated safety features, including polar life-crafts, helicopters and complete electronics. The ship was put into service on 23 June 1995 and has visited Heard Island, 200 miles from Kerguelen, several times.

During the voyage the vessel will make brief stops at Crozet and Kerguelen and the team may be able to operate from those islands.

How's DX

Stephen Pall VK2PS

There Are DXers and There Are DXers...

A few of the armchair DXers will do anything to obtain "that" missing card, while some of the active DXers will do anything to go to a much sought after country and operate from there.

The late Don Miller W9WNV in the 1960s operated from a variety of countries, which later turned out to be an unruthful claim to fame. In 1966 Don Miller "used" the callsign VK2ADY/VK0 and claimed to have been on Heard Island. In the end, truth caught up with him.

The ARRL Awards Committee released the following news on 21 February 1996: *"The ARRL Awards Committee met recently to review submitted documentation for the 1992-93 P5RS7 operation submitted by Romeo Stepanenko. After a review of all material available, the Awards Committee voted unanimously to disqualify Romeo Stepanenko from participation in the DXCC program.*

This disqualification is based upon Rule 12, Operations Ethics, and Rule 13. The disqualification means that Stepanenko is not eligible to participate in the DXCC program in any manner. This includes, as provided for under Rule 12, paragraph (b), disallowance of contacts made with any station or DXpedition operated by him from the time of this action."

Heard Island — VK0 — 53° 05' S and 73° 30' E

During the past months the Heard Island Expedition has been re-organised

for the 1996-97 southern hemisphere summer season. Given the revised schedule, and the necessity for rebuilding the team and financial resources, K0IR asked KK6EK and ON6TT to take primary responsibility for the 1996-97 Expedition. The project was brought under the auspices of Cordell Expeditions, which is a research organisation directed by KK6EK.

The Heard Island project is being implemented by the project directors Robert Schmieder KK6EK and Peter

Lothar T32ZB (l) and Phil T32O (r) in Phil's shack on Christmas Island.

Chartering vessels of this kind is not cheap. The total budget of the new expedition is $US320,000, out of which chartering of the vessel alone will cost $US200,000. There will be a 20 person radio amateur team who will pay $US10,000 each to participate. The rest of the budget will be funded by existing and future donations, sponsorship, and sale of souvenirs, video and other tapes. The radio team to go to Heard Island is EA8AFJ Michel Sabatino, G0LMX Vincent Denecker, HB9AHL Willy Rusch, JH4RHF Junicho Tanaka, KA6W Ted Algren, K0IR Ralph Fedor, K4UEE Bob Allpin, K9AJ Mike McGirr, KK6EK Robert Schmieder, N6EK Bob Fabry, NP4IW Carlos Nascimento, ON6TT Peter Casier, PA3DUU Arie Nugteren, RA3AUU Igor Harry Buklan, W60TC Glenn Vinson, W8FMG Wes Lamboley, WA0PUJ Glenn Johnson, WA3YVN Al Hernandez, and 9V1YC James Brooks.

You will note there is no VK radio amateur in the list. One such place was reserved for an Australian but no one was found, despite a diligent search on the west and east coast of Australia for a likely participant. Maybe the old spirit of "Aussie" adventure has died, or work, family and financial restrictions are the problem. Admittedly, the individual cost for a prospective Australian team member would run into some $AUS16,000 which includes the participation fee, return airfare to Reunion Island via Mauritius, and personal equipment such as sleeping gear, polar clothing, etc. So, if you feel that you are able to participate, there is a place reserved for you. If so, do not delay, and immediately contact Cordell Expeditions at the address below.

At the beginning of 1995, another group of DXpeditioners, the South Sandwich Island Antarctic DX Group (SSIDXG) planned to activate Heard Island starting from 2 December 1996. The leader of that expedition, Tony Deprato WA4JQS/VP8BZL issued a statement in February 1996 concerning the potential conflict between the two groups of Heard Island aspirants. Tony informed the DX Community that, with the re-activation of the KK6EK and ON6TT Heard Island DX Group's plans to go to Heard Island in January 1997, the SSIDXG has decided to step aside. Some of the reasons were that a major split would come about in the DX world as DXers would have to make a decision as to which DX group to support; and that the DX world could not afford to

supply money wisely to two highly expensive DXpeditions to the same island. One has to say that this decision is very sportsmanlike and the SSDXG has to be congratulated on their commonsense approach to the problem. Tony said further, *"Even though the SSIDXG has worked out the transportation for the activity, I have been able to negotiate a deal for two other Antarctic islands later in the year".*

As always, the Heard Island DXpedition is looking for individual donations. If you need Heard Island for your DXCC, now is the time to support the team with your contributions, even if it is small. The address for donations or information is: Robert Schmieder, Cordell Expeditions, 4295 Walnut Blvd, Walnut Creek, CA 94596 USA — Tel: (510) 934 3735 (voice and fax) — e-mail: cordell@ccnet.com.

Lacepede Island — VK6ISL

Malcolm VK6LC will be operating from Lacepede Island from 16 to 21 May. He will be joined by Dave VK6DLB to activate this new IOTA island. It is located on the north-west coast about 120 km north west of Broome and about 45 km west of Beagle Bay at 16° 55' S and 122° 10' E. It is in a remote area infested with saltwater crocodiles.

Malcolm will use new 40 m four square phased vertical antennas manufactured especially for this expedition by ATN Antennas. The QSL manager for this activity is Gianni Varetto I1HYW, PO Box 1, I-0060, Pancalieri (Torino), Italy.

Kermadec Island — ZL8RI

The Kermadec Island DXpedition Group is planning an 11 day activity from 4 to 14 May from Raoul Island in the Kermadec group. A "permit to land" and an "operating licence" have been issued, including the above callsign.

The group will have four complete HF stations on all bands, CW, SSB and RTTY. All the equipment is already in New Zealand and they are well equipped for low-band and new-band operation. The team has been given permission to remain on land the entire 11 days and operate around the clock. The expeditioners are Ken Holdom ZL2HU (leader), Chris Hannagan ZL2DX, Ron ZL2TT, Lee ZL2AL, Al WA3YVN, and one Japanese operator (to be announced later). The team will depart from New Zealand on 30 April aboard the research vessel 'Evohe'.

This modern ship has been inspected by members of the team in New Zealand and meets with their expectations

regarding reliability and safety, and has some of the best communication, navigational and mechanical systems available. The ship has two Zodiacs and two additional landing craft. The charter cost of the boat is $US25,000 and your financial support is urgently needed. All donations will be used for non-personal expenses. Send your donations to Ken Holdom, Kermadec Expedition, 31 St Jones Terrace, Tawa or to PO Box 56099 Tawa, Wellington 6006, New Zealand. Ken is also the QSL Manager for the expedition.

North Korea — P5

The DPRK (Democratic Peoples Republic of Korea) project group, is headed by Mr Chen Ping BA1HAM, the Deputy Secretary General of the CRSA (Chinese Radio Sport Association), who was the organiser of the successful Scarborough Reef activity. The group has been busy maintaining multiple contacts and discussing additional steps required to establish amateur radio in the DPRK.

A major donation of amateur radio related equipment has been shipped to the DPRK Amateur Radio Association. As there are only sporadic flight connections from Beijing, and an exceptionally severe winter is affecting normal life in the country, the spring visit to North Korea was re-scheduled to the second part of April. The underlying aim of the DPRK project is to establish permanent activity with the large base of radio communicating enthusiasts who are currently involved in amateur radio direction finding (ARDF) as well as in class room Morse competitions.

Callsigns of the Past

Following my list of past operators who were active from Macquarie Island, Ivan VK2NJ was kind enough to write to me and pass on some complementary information. Ivan was at Macquarie Island in 1960 as a radio officer and operated as VK0IT. Alf Kissick was his QSL Manager. He has a list of expeditioners who wintered on Macquarie from 1948-1994. Checking his list he makes the following observations: *"In 1948 I have no listing for Ted McCarthy VK1AA. Two things may have occurred. Either he was issued with the callsign prior to sailing and did not sail; or he was a supernumerary on the voyage (ie he sailed to Macquarie, but only assisted in the establishment of the base, then returned to Melbourne on the vessel).*

In 1950, VK1RF was Reg J Frost, who was the weather radio observer. Most of

the guys who wintered on the island used their own initials for their respective callsigns. In cases where there is only a first name in the list, I checked my original notes and have given the full name of who I think would have held the call. In 1953, VK1RF has the name Scott. It would be safe to assume that his call was Scott Little who was the radio supervisor/radio-physicist. In 1953, VK1BA was Brian A Fiebig, radio officer. In 1957, VK0CJ was Colin J McNaughton, radio supervisor. In 1972, VK0RC was R "Chris" McPhee, senior radio technician. In 1980, VK0DB was David J Barrett, electronics engineer.

Thank you Ivan for your contribution which has greatly assisted to portray the past correctly.

Future DX Activity

• Mario HB9BRM will be active from Sri Lanka as 4S7BRG until 17 April, from 1600 to about 1900 UTC daily on the 14, 21, 7 and 3.7 MHz bands, using wire antennas. QSL to home call.

• Gustav DL30AY is the new operator of the DP0GVN station located on the German Antarctic base Georg Neumayer (IOTA AN-016).

• Ron AA5DX will be active from Chagos Archipelago as VQ9DX on 40, 80 and 160 metres. QSL to Ron Marra, Marginal 301 C, La Rambla Suite 205, Ponce, PR 00731, Puerto Rico.

• Try to catch Andy G4ZVJ on St Helena until 12 April, operating as ZD7VJ on CW only on 1.827, 3.503, 7.003, 10.107, 14.027, 18.077, 21.027, 24.897 and 28.027 MHz, split, listening up. QSL to home call (new address), Andy Chadwick, 5 Thorpe Chase, Ripon, North Yorkshire, HG4 1UA, UK. Later (16 to 23 April) Andy could be active from Ascension Island as ZD8VJ.

• PY1UP will be active for four months from the Brazilian Naval Base on Trindade Island as PY0TI. QSL via PY1UP.

• Mike KB7HO will be signing VQ9HO. Active mainly on 20 metres SSB, split mode, transmitting on 14140 kHz and receiving between 14180 and 14190 kHz. QSL to KB7HO.

• Francois TJ1AG is active daily between 2000 and 2300 UTC in the African Net on 7065 kHz. QSL to F5RUQ.

• Hungary is celebrating the "Millecentenary", 1100 years of Hungarian nationhood. Some Hungarian amateurs are using the HAM prefix during 1996 instead of the customary HA.

• The vote on the DXCC status of Mt Athos, according to Garth VE3HO, Chairman of DXAC, has been postponed indefinitely.

• VG3CRC, a special event station, celebrates the 100th anniversary of the Red Cross in Canada. QSL to VA3CRC.

• Thierry FR5DT/J is on the air from Juan de Nova. He is not an experienced operator. He was heard working on 14122 at 1800 UTC. QSL to FR5DT/J, Traws, BP 386, 97410 Ile de La Reunion, via France.

• Michel FR5HG, who was on Comoro Islands, was heard to say that there is a good possibility for activity from Glorioso Islands in May.

Interesting QSOs and QSL Information

• AL7EL/KH9 — Tom — 14195 — SSB — 0612- Feb (E). QSL to Lloyd Westbrook K4HQI, Box 638, Commerce, GA 0529, USA.

* **VK9XY** — Jan — 14195 — SSB — 1123 — Feb (E). QSL to Rudi Hein DK7NP, Am Uferholz 7, D-96047, Bamberg, Germany.

* **VR6CB** - Clarice — 14174 — SSB — 0511 — Feb (E). QSL to PO Box 11, Pitcairn Island, South Pacific via New Zealand.

* **T99T** — Mustafa — 14267 — SSB — 0618 — Feb (E). QSL to Tomislav Dugec 9A2AA, Vetranica 13, HR-21000, Split, Croatia.

* **ZL7BTB** — 7003 — CW — 0735 — Feb (E). QSL to Antti Kantola OH5TB, Kalervonk 12 A-8, SF-00610, Helsinki, Finland.

* **9N1RHN** — Rich — 14185 — SSB — 0345 — Feb (E). QSL to Rich Kingston, PO Box 10801, Kathmandu, Nepal (no callsigns on envelope!).

* **9N1ARB** — Dick — 14210 — SSB — 0314 — Feb (E). QSL via VK6UE, W Billington, 30 Bindaree Tce, Kingsley, WA 6026.

* **8Q7BC** — Harry — 14320 — SSB — Feb (E). QSL via David Schoen N2KX, 24307 Magic Mountain Parkway 114, Valencia, CA 91355, USA.

* **F05PJ** — Lolo — 14232 — SSB — 0545 — Feb (E). QSL to PO Box 110402, Mahina Nr Papeete, French Polynesia.

* **PJ8AD** — Bert — 18130 — SSB — 1241 — Feb (E). QSL to POB 518, Saba, Netherlands Antilles, Caribbean.

* **N2ZLG/HK6** — Fabius — 14210 — SSB — 0513 — Feb (E). QSL via the HK6 Bureau.

* **T320** — Phil — 14190 — SSB — 0529 — Feb (E). QSL to Paul E Lange WC5P, 705 North Bend Rd, Weatherford, TX 76086, USA.

From Here There and Everywhere

* If you have worked VI75RAAF, the special event station celebrating the 75th anniversary of the Royal Australian Air Force, your QSL and Award manager ($5.00 for award) is Brian VK4LV, whose address is correct in the callbook.

* Graham ZL4MV, who was active as ZL9GD, has moved from Auckland Island and has gone to Chatham island where he operated as ZL7MV early in March.

* Frank DL7FT, who was active recently as TT8FT in Chad (the first German amateur to do so), advises that his address is incorrect in the 1995 Callbook and he was left out of the 1996 Callbook. He is correct in the 1994 Callbook. He is QSLing direct only under the two addresses: Frank Turek, Box DL7FT, D-14004, Berlin, Germany; or Frank Turek, Box 1421, D-14004, Berlin, Germany.
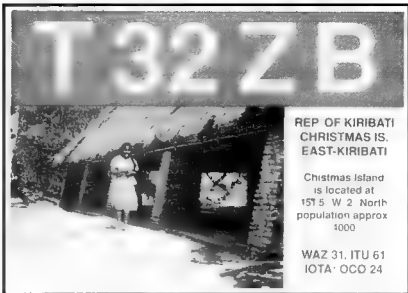
* The United Kingdom is running out of the familiar G-series callsigns which the Government has issued since the 1920s for most UK stations. The Radiocommunication Agency will begin issuing the M-series calls starting 1 April to all new full licences (both Class A and B). The new prefixes are: M (England), MW (Wales), MM (Scotland), MI (Northern Ireland), MD (Island of Man), MU (Guernsey), and MJ (Jersey). The special prefixes for radio clubs will be: MX (England), MC (Wales), MS (Scotland), MT (Island of Man), MN (Northern Ireland), MP (Guernsey), and MH (Jersey).

* According to a press release dated 1 March 1996, the central address for enquiries and administration of the RSGB IOTA (Islands on the Air) program is now: RSGB IOTA Program, PO Box 9, Potters Bar, Herts EN6 3RH, England. Roger Balister, who looked after the IOTA program in total, will become RSGB IOTA Manager. The authorised checkpoint for Australia, New Zealand and the Pacific, is Jim Smith VK9NS, H10XA, PO Box 90, Norfolk Island 2899, Australia.

* According to Arie 4X6UO, residents in Gaza and Jericho will not obtain a new prefix from the ITU before 1997.

* Canadian radio amateurs might use the VC, VD, V07, V08, VY7, and VY8 special prefixes until 30 May to mark the 50th anniversary of UNICEF, the United Nations Children Protection Agency.

* Palmyra Atoll KH5, according to an article in *Pacific Daily News* of 12 February, was sold to a New York investment company which might use the island for scientific research and hotel development.

* The new address of Mike K9EC, QSL manager for VS6WO, is Michael Zeug, 3850 Sugar Pike Rd, Canton, GA-30115, USA. Please do not send QSL cards to the Hong Kong QSL Bureau.

* Rotuma Island (OC-060) now has its own resident Rotumian amateur under the callsign 3D2AA. QSL to VE6VK.

* The Pratas Island QSL cards, BV9P, are in the mail; several Australian and New Zealand operators have received them.

* As from 1 April, according to the DXCC desk, the DXCC countries list total will be 329 countries and it will take 320 countries to be on the Honour Roll.

* Warren VK0WH prefers the CW mode due to his receiver set up and, because, due to lots of man-made noise, he finds SSB difficult to use. He was not heard much during February. He is very busy with his professional work which carries a workload of sometimes 60 hours per week, leaving very little time for amateur radio.

* Gunther ZK1DI, who has been active since November, has ceased operations mid-March.

* According to several sources, IRCs are not acceptable in South Africa (ZS).

* The Town of Beaumaris on the Isle of Anglesey (UK) celebrates 700 years of its Charter, granted by Edward I in 1296. The special event station GB4BEA will take part in the celebrations by being on

REP OF KIRIBATI
CHRISTMAS IS.
EAST-KIRIBATI

Christmas Island is located at 157 5 W 2 North population approx 1000

WAZ 31. ITU 61
IOTA· OCO 24

the air from 0001 UTC on 18 May to 1600 UTC on 19 May. On 20 metres the frequencies will be 14270 and 14050 kHz. A special QSL card can be obtained from GW0ABL.

* The QSL manager for HC8A, HC8J, P4OJT, P4OBT and HC1OT, is Betsy WV7Y.

* Lothar DJ4ZB was kind enough to send his QSL card, together with a photo of himself and Phil T32O, to me, full of praise for the hospitality which he received on Christmas Island. He spent many happy days on the Island during the months of September, October and November 1995 as T32ZB. He reminds us that all direct QSLers that postage rates are very expensive in Germany. One surface mail letter (outside Europe) of 20 gm costs DM2.00; and 50 gm costs DM3.00. An Airmail letter (outside Europe) of 20 gm costs DM3.00; and 50 gm costs DM4.00. But, for one IRC, he gets stamps only to the value of DM2.00, so you really should send him two IRCs. For one "green stamp" he gets approximately only DM1.40, so he needs two green stamps and one IRC. He is happy to answer cards via the Bureau; so if you are not in a hurry, send your card via the QSL Bureau.

* In January Amateur Radio I floated the theory that the "local area slim" who operates only CW could be a lonely ship's radio officer. I received two letters with a variety of theories about the possible suspect. The writers think the operator is a highly skilled CW person whose licence no longer allows operation on the 14 and 7 MHz bands, and it is more likely that he is a VK and not a ZL. The other opinion says that it could be an operator on any of the sailing ships, or a seasonal worker on a holiday cruise. The mystery deepens. However, our "slim" has not been heard for about four months.

* Graham ZL4MV was active for a short period on Auckland Island. He had only 24 hour notice to go on this trip so he went with minimum preparation, with only wire antennas and heavy duty batteries to operate from dry land. There was no generator, no amplifier and no beam antenna. He was heard at 0702 UTC on 20 February, huffing and puffing, telling his QSO partner that he just carried up-hill two heavy truck batteries which he used as a power supply. These batteries were brought ashore by a boat after they had been recharged. QSL goes to Graham L Dawson ZL4MV, 32 Vernon St, Invercargill, 9501, New Zealand.

QSLs Received

XZ1A (3 m JA1BK), YA9XL (2 w F5TCN), TJ1JB (8 m KE9A), 3V8AS (6 w HK5GQM), 8Q7CW (3 m DK9FN), ET3KV (3 m DL4VU).

Thank You

Many many thanks to all my friends who sent congratulatory messages in connection with the news as published in February Amateur Radio. It is your help, your encouragement and your assistance

in sending me all the DX information, which makes writing this monthly column so much easier. Special thanks to VK2NJ, VK2XH, VK2KFU, VK2TJF, VK4GV, VK4AAR, VK5QW, VK5WO, VK6LC, DJ4ZB, DL7FT, GW0ABL, KK6EK, WV7Y, ARRL DXCC desk, and the publications QRZ DX, The DX Bulletin, The DX News Sheet, INDEXA, The 425 DX News, and GO list QSL Managers list.

PO Box 93, Dural NSW 2158

FTAC Notes
John Martin VK3KWA, Chairman, Federal Technical Advisory Committee*

New UHF and Microwave Records

On 12 December 1994, a contact between Russell Lemke VK3ZQB (near Port Fairy) and Roger Bowman VK5NY set new Victorian and South Australia records of 466.4 km for the 10 GHz band. On 30 December 1994, Roger set a new national and world record of 1912.1 km by working Wal Howse VK6KZ.

The world record still stands, but the Victorian 10 GHz record was broken twice on 13 January this year. Operating portable from Mount Dandenong, Alan Devlin VK3XPD worked Trevor Niven VK5NC over a distance of 500.8 km. Half an hour later he worked Roger VK5NY, who was operating portable at Mount Magnificent, a distance of 657.1 km.

The very extensive tropo opening in mid-February also resulted in new records on 432 and 1296 MHz. On 14 February, Cec Andrews VK6AO worked Colin Hutcheson VK5DK on 432 MHz, for a new South Australian record distance of 2361.3 km. This record fell three days later. On 17 February, Trevor VK5NC worked Don Graham VK6HK for a new South Australian 432 MHz record of 2371.9 km.

On 16 February, Cec VK6AO worked Trevor VK5NC on 16 February and set a new South Australian distance record of 2364.2 km.

Finally, two more 1296 MHz records. On 16 December 1995, an RTTY contact between VK3ZQB and VK3KWA set an inaugural Digital Modes record for the 1296 MHz band, a distance of 268.6 km. On 16 February this year, Russell VK3ZQB worked Alan VK3XPD, who

was operating mobile in the eastern suburbs of Melbourne. The distance has not been confirmed yet, but is around 260 km and will be a new 1296 MHz mobile record.

Congratulations to all those involved in setting these new records.

80 and 40 Metres — Digital Modes

No further responses have been received on the 80 metre digital modes segment. The existing 3620 – 3640 kHz segment is in line with other countries in the region, and with the North American packet segment of 3620 – 3635 kHz. Any change would cause a great deal of dislocation, so I suggest that we must leave this segment where it is. This does not allow much space for Novices to experiment with digital modes, but then no-one has enough space on 80 metres.

On 40 metres, the situation is different and it does not seem practical to leave things as they are. The RTTY segment in Region 1 is 7035 – 7045 kHz, and most international operation in Region 2 is around 7040 kHz. The Region 3 band plan is the "odd man out" with its RTTY segment at 7025 – 7040 kHz, which seems to be 5 kHz lower than the rest of the world.

It appears that our lower limit of 7030 kHz is reasonable, but it is not practical to allow only 5 kHz overlap between our RTTY segment and that used in Regions 1 and 2. I would suggest that our 40 metre band plan should be changed to extend the upper limit of the RTTY segment up to 7045 kHz. I would appreciate any further comments as soon as possible.

PO Box 2175, Caulfield Junction, VIC 3161

Novice Notes

Peter Parker VK1PK*

Homebrewing for the Novice

A longing to build a small transmitter, receiver or piece of test equipment is commonly expressed by many amateurs. All too often, however, the longing remains merely that, due to perceived difficulties in obtaining equipment, a lack of test equipment, or not having a suitable circuit diagram. Yet, these difficulties can be overcome, and the satisfaction of successfully completing a project is immense. This month's column aims to answer a few of the questions aspiring home-brewers ask.

Selecting a Project

The first step is to determine what you want out of a project that you are planning. Is the device being built for the experience and pleasure that its construction provides, or is it to test a particular circuit technique or component? Maybe the project is because commercially made equivalents are unavailable. Alternatively, it could purely be the satisfaction of working the world with a home built transmitter, or of making measurements with test equipment that would be unaffordable if purchased.

Whatever the reason for building, it is important that the features you want are defined, so that a design can be selected to suit your needs. It may happen that an article on a project with all the wanted features is found, and, furthermore, all parts for it are obtainable. A kit could even be available. Otherwise, the constructor may prefer to borrow stages from several circuits, and build a unique device that meets all requirements. This becomes particularly true for the more experienced experimenter who seldom follows published circuits exactly.

For the beginner, though, it is best to work from the one design and not from parts of several. The decision as to which one depends on available information, features provided, and the completeness of the project article, along with complexity and cost considerations.

Sources of Information

Home-brewers normally have a wealth of material on which to base projects. This is obtainable from:-

Books. Many publications are available to the amateur experimenter. As well as the conventional RSGB and ARRL handbooks, more specialised references cover practical aspects in greater detail. Titles to look out for (whether new or second-hand) are listed near the end of this article. Most are obtainable by mail order from Daycom Communications P/L in Melbourne, or via your WIA Divisional Bookshop.

Magazines. In addition to projects in the major amateur periodicals, such as Amateur Radio, Radio and Communications, QST, 73, CQ, Practical Wireless, and RadCom, there occasionally appear radio projects in magazines such as Electronics Australia and Silicon Chip. Some magazine designs have the advantage of a kit being available. However, be wary when considering some of the transmitter projects featured; a crystal-locked 100 milliwatt 80 metre AM transmitter is simple and cheap, but could disappoint when used on-air under modern conditions.

As well as being stocked by newsagents, various local and overseas magazines are carried by public, TAFE and university libraries. Photocopying facilities are normally available.

In addition, QRP (low power) enthusiasts have their own publications. Probably the best known is Sprat, published by the G-QRP Club, renowned for its technical articles and circuits. The US-based QRP Amateur Radio Club International issues QRP Quarterly, while the Australian-based CW Operators' QRP Club produces Lo-Key.

Travelling Circuit Books. This is a service to the VK CW Operators' QRP Club members. Consisting of approximately 100 pages of constructional articles, taken from various magazines, travelling circuit books are circulated among participating members. As the only cost involved is the postage of the book to the next member on the list, they are an economical way of gaining access to a wealth of information.

The Internet. With the rapid growth of the Internet, thousands of discussion groups (news groups) have sprung up, catering for a broad range of interests. The one for radio home-brewers is called rec.radio.amateur.homebrew. If you have a particular question, want to know how to obtain a part, or simply want to share your experiences with a particular component or circuit design, the newsgroup would be a good forum for your message. Serving a more specialised audience than newsgroups (such as QRP enthusiasts, for example) are mailing lists. To participate in a mailing list, all you have to do is to send an e-mail message to a particular address saying that you want to subscribe and, before long, you will receive the contents of the list as electronic mail.

Tools and Test Equipment

To complete most projects, only basic hand tools will be required. The following is a suggested priority list of other tools and test equipment that will be found useful. Essential and/or inexpensive items head the list, though the exact order of priority will vary with different projects.

15 to 25 watt soldering iron with fine tip.
Benchtop power supply (to suit projects being constructed)
Multimeter (analogue or digital).
General coverage receiver.
Various relative RF indicators (such as field strength meters and absorption wavemeters).
Dip oscillator.
RF power meter and 50 ohm dummy load.
Frequency counter.
Inductance and capacitance meter(s).
RF signal generator.
Oscilloscope.

All items on the above list (except the oscilloscope and the general coverage receiver) can be assembled at home, with kits for some being available. It is not mandatory that the experimenter possess the full range of equipment listed, as improvisation is often possible. For example, an inexpensive AM/shortwave receiver can give a rough indication of a VFO's frequency, verify the operation of crystal oscillator stages, or even act as a crude signal generator. This is made possible by the use of the local oscillator signal generated from within the set; its frequency will normally be 455 kHz below that indicated on the dial

Obtaining Components

The perceived scarcity of components is one of the reasons stated for people not building equipment. Yet, homebrewing

has never been cheaper or easier than it is right now, thanks to the throw-away society, and the rapid obsolescence of electronic equipment. While it is true that the conventional parts outlets do not stock many of the specialised components required by radio experimenters, these can be obtained by other means, including:-

Club or Divisional part supply facilities. Two of these are known to the author. Both are available to members only, and can supply a range of esoteric parts and kits at attractive prices. The first of these is the VK5 WIA Equipment Supply Committee. As well as stocking various RF components, an impressive range of kits is on offer. These include VHF/UHF transverters, packet radio modems and ATV transmitters. Mail orders are accepted from all states; the only requirement being that you are a WIA member. Send a SASE for the latest price list.

The CW Operators' QRP Club maintains its Kitsets Activity Centre for the benefit of members. While some kits are stocked, the emphasis is on components, with toroids, RF ICs, ceramic resonators, varicap diodes and FETs being among the parts obtainable. Again, a mail-order price list is available.

Hamfests and Junk Sales. Attendance at these is a must for radio experimenters; large quantities of components and surplus equipment can sometimes be had for just a few dollars. Apart from piles of ex-commercial VHF/UHF transceivers (from which components can be salvaged), items such as crystals, books, variable capacitors and vernier drives may also be available if you look hard enough.

Old radio and TV sets. While dismantling old radios and TV sets is time-consuming, the use of salvaged components can reduce construction costs. Rather than remove all parts from printed circuit boards and placing them in jars, it may be preferable to keep the boards intact, and remove components as and when required. Valve radios are particularly desirable for the tuning capacitors they contain, while the power transformer can be rewound for power supplies, or used as a source of wire for antennas.

Swap-meets, auctions, rubbish tips, second-hand shops. All of these are worth an occasional visit, as equipment of value to the experimenter (for salvage or conversion) may be on offer. In addition, items such as multimeters and tools can sometimes be purchased second-hand. Auction dates and venues are normally listed in the classified section of local newspapers.

Circuit Construction Methods

While the conventional printed circuit board is the standard for manufactured electronic equipment (though it is now being replaced by surface mount technology), there is no reason for the amateur to use this method for their own projects. While conventional PC boards look neater than other techniques, they suffer from the disadvantage of requiring a new board to be etched if substantial modifications to the project are desired. Further time is wasted if these do not perform as envisaged. Thus, unless you know the circuit is reliable, it is worthwhile to consider alternatives to PC boards, particularly if the project uses only discrete components.

One such alternative is to use an etched printed circuit board, but solder components onto the copper side of the board. This obviates the need to drill holes, and makes it easier to make changes. For smaller projects that do not use ICs, the use of small pieces of adhesive tape placed on the parts of the board where you want the copper to remain is suggested as a simple alternative to conventional methods of board production.

The "paddyboard" form of construction is also suited to projects for which the ultimate in miniaturisation is not required. While it uses PC board material, paddyboard requires no etching; component leads not connected to the copper surface are soldered to small insulated pads, made from spare PC board material. These pads may be glued or soldered to the main board. It is very easy to modify circuit layout and add extra components. Again, paddyboard is most suited to circuits not containing ICs, though this limitation can be overcome if ICs are mounted on small pieces of vero or matrix boards beforehand. The use of high-value resistors (several megohm) as standoff insulators, soldered to the main board is a similar approach that has worked well. All of the construction methods mentioned so far are suitable for audio, HF, VHF, and perhaps UHF projects.

If compact construction is required, but the constructor is unwilling to use a conventional PC board, matrix board is a good alternative. Having holes punched every 2.5 mm, IC projects can be quickly assembled. Matrix board works well for RF projects well into the VHF region, and is stocked by the normal parts suppliers.

A refinement of matrix board is veroboard. This is matrix board with a series of parallel copper strips, which can be cut as required by using a drill bit held in the hand. While suitable for power supply and audio projects, the capacitances between the long parallel strips may impair the performance of RF projects. Veroboard can be made into matrix board simply by immersing it in a bath of PCB etchant solution.

Construction and Troubleshooting

Once all components to build a particular project have been gathered, and a construction method has been decided, the project can now be assembled. If a simple project, or a well-known design, the entire board can be assembled in the one sitting. Otherwise, if the project is an unfamiliar circuit, or has various stages derived from several

sources, it is preferable to build and test one stage at a time, before moving on. For this type of construction, where the developmental prototype becomes the final model (possibly after several changes), one can easily see that an adaptable construction method, such as paddyboard, or the use of matrix board, is preferable to a PC board, where significant changes require a new board to be etched.

For a large project, such as a receiver or transceiver, it is desirable that, rather than mounting the entire circuitry on one large board, several smaller boards be used instead. This modular approach permits the project to be an evolving piece of equipment, with additions made as time, inclination and funds permit. This method is also compatible with the "build and test" approach recommended previously and the desirability of having RF-sensitive stages shielded from one another.

If the project involves RF (especially if it is a transmitter or power amplifier), the box housing it should be shielded. This does not necessarily mean a conventional metal case is required; boxes made from printed circuit board material are also effective.

The most important aid to trouble-shooting is an ability to think logically. The possession of the test equipment mentioned above, plus a schematic diagram of the circuit under test, is also desirable. Generally, with trouble-shooting, one checks the overall equipment, by identifying which functions do and do not work, and attempts to isolate the area of the fault.

In the case of home built equipment under development, it is often not so much a fault, as a performance deficiency that needs to be remedied. This may simply entail the use of a slightly different component value, or may require the redesign of a whole stage to perform to the specifications required.

Safety

It is not out of place here to discuss electrical safety. The construction of equipment containing high voltages require a change to one's working habits, to minimise the risk of electrocution. The following precautions should be taken:–
Do not work on live equipment (switching off is not sufficient — unplug it from the wall).
Discharge electrolytic capacitors before working on a project.

Insulate exposed high voltage points in equipment where possible.
The current ratings of fuses should be related to the expected current consumption of the project, and not to the contents of your junk box.
Check wiring after construction (preferably by someone other than yourself).
Use proper plugs for power connections. Work with one hand behind your back if you must operate on live equipment. Keep half-built projects and chassis locked away from children.

The above list is not complete, and further information can be found in some of the references mentioned below. Initially, it is wise to steer clear from high voltage projects if you have the slightest doubts as to your ability to construct them safely.

Conclusion

While the impression may be conveyed that constructing equipment is an activity calling for a high degree of specialised knowledge, and that it is all too hard for the average amateur, nothing can be further from the truth. By starting with simple one and two transistor projects and commercially available kits, one's knowledge will steadily increase to a point where more complex projects can be confidently tackled. By this time you will be able to construct an item merely from a schematic diagram, and start to develop your own designs from sections of circuits gleaned from various publications.

Appendix One
References for the Radio Experimenter
ARRL/RSGB Handbooks.
Solid State Design for the Radio Amateur (DeMaw/Hayward).
QRP Notebook (DeMaw)
Amateur Radio Techniques (Hawker)
G-QRP Club Circuit Handbook (Dobbs).
WIA Book (WIA).
Radio Projects for the Amateur (Diamond).

Appendix Two
Useful Addresses for the Homebrewer
(This list is not exhaustive; a more complete version appears in "Radio Projects for the Amateur".)
CW Operators QRP Club Kitsets Centre, 5 Joyce St, Glengowrie, 5044
(08) 295 8112

VK5 WIA Equipment Supplies Committee
PO Box 789, Salisbury, 5108
J&A Crystals
20 Delville Ave,
Mentone, 3194
(03) 9583 4813
Daycom Communications
37A Fenton St,
Huntingdale, 3166
(03) 9543 6444
Stewart Electronics
44 Stafford St,
Huntingdale, 3166
(03) 9543 3733
*7/1 Garran Place, Garran ACT 2605
VK1PK @ VK1KCM.ACT.AUS.OC

ar

Silent Keys

Due to space demands obituaries should be no longer than 200 words.

The WIA regrets to announce the recent passing of:–

F J	ASTON	VK1FA
V (Val)	GODBEE	VK2AKV
G S	RADFORD	VK2LB
E	MANSON	VK3ADU
B R (Bruce)	MANN	VK3BM
A R	LAWSON	VK3PRL
K G	PEARSON	VK5APN
P H	RUMBLE	VK6NAT
J F	GRACE	VK7ZJG

Bruce Mann VK3BM

On reading his life story in the recent OT magazine, it is clear that Bruce wished to make his hobby a medium for world friendship through amateur radio. He was known throughout the world for his excellent phone signals. He always strived for perfection.

Over the years he entertained dozens of hams from all parts of the world and provided first class motel type accommodation for them. He even had the same service for groups of visitors from various radio clubs or other interested parties.

He was born at Quambatook in 1907, and died a few months before his 89th birthday. He had been involved in several accidents which hastened his demise. At the OT dinner a card, signed by the 70 hams who were present, was sent to his widow Margaret.

Murray Campbell VK3MR

ar

International Amateur Radio Union Monitoring Service (IARUMS) — Intruder Watch

Gordon Loveday VK4KAL*

Improving band conditions have brought about a corresponding increase in the number of "sightings" of intrusions. The Indonesian problem is in full swing again with the logging season in that country being operational. All-out war has been declared by some irate amateurs. It is now quite rare for these intruders to be allowed to converse for any period of time in the ham bands. Alert hams find them and the process of elimination starts. This commendable practice has proven to be the only direct method of removal that offers speedy results.

CW buffs will be particularly affected by the heavy CB pollution on the bottom end of the 10 m band. Methods of reducing the effectiveness of interfering signals are available from the Monitoring Service Co-ordinator.

Two metre band intrusions have also been increasing, with reports from various parts of the country being sent in. Hang gliders, railway inspection teams, and transport operators are some of those detected. The majority of these sorts of intrusions are of short duration and very localised.

Another serious matter is the apparent use of amateur repeaters for work related matters. This is a case of misuse and is best dealt with by the trustees of the particular repeater concerned.

As mentioned above regarding the Indonesian intrusions, amateurs in our region have become increasingly militant and frequently subject these intruders to a barrage of CW signals and plain language requests to MOVE! This action has had its successes with some intruders migrating to band edge areas.

It was reported in the Region 3 January Summary that Karl VK6KXW has been awarded a 1995 Merit Certificate for his dedicated observations of VRQ and partial removal of same. My congratulations, Karl. I hope others will follow your example. We must defend our exclusive amateur radio frequencies.

The IARU Monitoring System — Part 4

(See previous issues of *Amateur Radio* magazine for parts 1, 2 and 3 of this continuing series about the IARU Monitoring System.)

I think it is about time to get into the "nitty-gritty" of the system. It should be obvious to those following the series why we need many observations and observers. Many reports on the same intruders are needed to convince the Authorities, that we want ACTION taken, not lip service, to have them removed from our bands.

Now some general information.

Log sheets are obtainable from your State Intruder Watch Co-ordinator, or direct from the Federal Co-ordinator, VK4KAL, QTHR. Information on the filling in of log sheets is also available from the same sources.

A question often asked is what happens to the completed log sheet? The answer is that it finds its way back to the Federal Co-ordinator where, on receipt, it is recorded in the SMA/WIA data base. From this data base, which at present time holds details on 188 separate intruders, a summary is compiled. This summary is available to any amateur on request. Its main purpose, though, is to notify the other regions what is happening in our region intruder wise. The IARU Region 3 co-ordinator also gets this.

In VK, a copy is faxed to the SMA in Tasmania and in Canberra, to WIA Federal, and to each State co-ordinator on a rotational basis. I must stress that the Monitoring Service is NOT interested in local issues, which must be taken up with the state offices of the SMA, nor do "we" deal with foul or abusive language.

As this series covers only the basics, many more questions are bound to be asked, so let me hear them. Some may be answered in *Amateur Radio*. The subject can be simple or complex. It is up to you, the amateur, to decide "how much you want to enjoy the hobby", and as to what you do about it.

Don't be frightened to submit an intruder report because you are unsure of the mode. Just describe it as best you can or send a tape with your log. Try and observe if any intruders are coming up on a regular basis. Some are as regular as clockwork; these are the ones worth watching and reporting.

Please note that I accept log sheets from ALL amateurs, whether they be members of the WIA or not.

*Federal Intruder Watch Co-Ordinator, Freepost No 4 Rubyvale QLD 4702 or VK4KAL@VK4UN-I

Over to You — Members' Opinions

All letters from members will be considered for publication, but should be less than 300 words. The WIA accepts no responsibility for opinions expressed by correspondents.

Nerves

Having been present at a number of examinations being sat by amateurs and prospective amateurs, I have noticed one of the main problems with the CW sending exam is nerves.

Sure enough, a lot of people sit for exams ill-prepared and do not pass for that reason. But a fair number of candidates sit time and time again, only to fail when the tape recorder is turned on.

Listening to these candidates during their practice sessions, it is obvious that they are very capable with the Morse key and deserve to get through.

Maybe the WIA could perhaps select a couple of examiners who are proficient CW operators to listen to these people under less stringent conditions and assess whether they deserve, after a number of exams, to be given a pass on their abilities. I am sure our hobby would benefit and a few more well deserved full calls would be the result.

John Bedwell VK3EHZ
49 Winyard Drive
Mooroolbark VIC 3138

Jargon

In the February 1996 issue of *Amateur Radio*, John Martin VK3KWA discussed the new Technical Licence Specifications, the fact that they were difficult to understand, and the uncertainty concerning which modes were permitted.

I must confess that my thoughts were not so kind. I thought the regulations were written in jargon — officialdom gone mad!

What is the merit of writing regulations in code such that the people

who are expected to abide by them have to spend hours trying to decipher what they are allowed to do? Why should it have even been necessary for John to write an article to try and further enlighten us on what the jargon means? What was wrong with writing the regulations in plain English, a language hopefully most of us understand?

Lloyd Butler VK5BR
18 Ottawa Avenue
Panorama SA 5041

Thanks to Federal WIA

It's not often I write, but I felt compelled to put pen to paper to ensure that my positive encouragement got through to you. I consider myself to be what you would probably call an average member of the WIA with my major focus being on local club issues and events. I follow with interest our weekly VK5 Division news broadcasts and often hear news items relating to discussions with the SMA on the various big issues that are currently affecting our hobby.

I just wanted to assure you that your efforts and deliberations in this area are appreciated. I feel confident that there are thousands of amateur radio operators, like myself, who listen with interest to the activities of the Federal

WIA and appreciate the volunteer effort being put into this most important aspect of protecting and promoting our hobby.

Feel proud of your achievements over the past 12 months. I am certainly impressed with our pro-active approach to SMA matters and feel confident that our hobby is being represented to the highest standard.

Keep up the great work, and please accept my sincere appreciation for your efforts.

Mark Phillips VK8MA
PO Box 228
Howard Springs NT 0835

Need for CW

Let's be honest with ourselves. There will come a day when the CW requirement for HF occupancy is dropped.

The year is 1996. In the 90s the advances have been remarkable; mobile telephones, and communications to practically anywhere you care to name via the Internet. The youth of today are not interested in our hobby. We are seen as "a mob of old farts, with nothing better to do with our spare time". We can chuckle, but it is so close to the truth.

We are losing WIA members and the number of newcomers is falling. Why?

We have, in my opinion, an image problem. Why should the youth of today sit in front of a "black box" and simply talk to someone, when they can connect to the Internet on their computers and have almost a three dimensional "contact" anywhere in the world, for very little cost? (And, probably more to the point, without having to pass an examination!)

The good old days when a home brew SSB transmitter was the "height of technology" are over. The face of amateur radio has changed and will continue to change.

The Spectrum Management Authorities, world wide, see the commercial value of our resource and some of "our" bands are being threatened. The old sayings of "Use it or Lose it", "Populate or Perish" are becoming a reality.

As a Z call, I can use practically any mode I desire, including CW, *without the necessity of proving proficiency in any of them*. I can now use 29 MHz, albeit only in the FM mode. What is so special about our HF Bands?

How many Full Call amateurs now use commercial equipment, rather than

WIA News

International Contestants Line Up for Direction Finding Championships

Contestants from six, or possibly seven, overseas countries will arrive for the Second Region 3 Amateur Radio Direction Finding (ARDF) Championships, to be held in Townsville over July 15-20 this year.

The Chinese Radio Sports Association, the Japan Amateur Radio League, the Korean Amateur Radio League, and the New Zealand Association of Radio Transmitters will all field teams. From Region 1, there will be a small team from Bulgaria and a team of five from the East Kazakstan Radio Engineering and Radio Sports School. A single entry from the USA is also expected. A local team will contest the Championships on behalf of

the WIA. There will be society officials accompanying the teams from overseas. The new Secretary General of the Chinese Radio Sports Association, Chen Ping BAIHAM, who is also Chairman of the International Amateur Radio Union (IARU) Region 3 ARDF Committee, will be guest of the Townsville Amateur Radio Club, who are hosting the Championships.

ARDF is a cross between a cross-country run and the old familiar amateur radio fox hunt. A number of transmitters are placed at intervals along a course. They turn on and off in a timed sequence. Contestants travel on foot and have to find the transmitters and complete the course in a given time. ARDF is an activity for young and old alike. Only simple, handheld equipment is required. Bands used are 80 m and 2 m.

According to the Championships organiser, Wally Watkins VK4DO, production of the necessary transmitters is almost complete and long term testing should already be under way by the time this is published. Special timers are being tested.

The Federal WIA has provided financial assistance to the Championships. Anyone interested in taking part, either as a contestant, a referee or general helper, should contact: The Secretariat, 2nd IARU region 3 ARDF Contest, W A Watkins VK4DO, PO Box 432, Proserpine Qld 4800.

The European ARDF Championships are being held in Bulgaria in the first week of September this year and Wally VK4DO, has accepted an invitation to take part as an international referee.

homebrew? How many have touched a key since their examination? On the other hand, how many do use this mode? CW certainly won't go away.

Could someone please put forward an argument for the necessity of retaining CW as a prerequisite for occupation of the HF Bands?

Not an argument based on:

"We had to do it" (that argument is petty and banal; a bit like telling trainee pilots that they must train in Tiger Moths!);

"CW is the only mode allowing error free communications during poor conditions" (Are we at war? Are our communications that important?);
or

"We will end up having the HF Bands populated by unskilled operators — the CBers — who have little or no skills" (I seem to recall a similar argument when the Novice Licence was first mooted.);

but an argument based on fact.

Many Government agencies, world wide, no longer have the need or the requirement for CW. A Command Instrument Rated Pilot no longer has to show proficiency in CW at 10 wpm, as they did only a few years ago. The Marine Authorities in Australia, and many other countries, no longer use CW even for emergency communications.

As Godfrey VK5BGW wrote in December 1995 *Over to You*, CW is not dead. It never will die because we have the enthusiasts who enjoy that mode. It could be a fact, though, that *our hobby dies*, because our bands will simply be taken away from us.

The simple answer to the "Use it or Lose it" principle is to attract more and younger people to our hobby.

Where do we start? In my youth the simple thrill of making a crystal set was something special. Now, the youth of today have personal mobile telephones and miniature colour TV receivers. Home computers and communications are taken totally for granted. What on earth will they have tomorrow? I can tell you now that the CW requirement for HF band occupancy certainly does nothing towards attracting bright young men and women to our hobby.

If we don't use our bits of the spectrum, we will lose them. It is a case of populate or perish.

Peter Whellum VK5ZPG
PO Box 317
Willunga SA 5172
ar

Packet World

Grant Willis VK5ZWI*

Introduction

Hello everyone. This month I am going to continue with the article, by John VK1ZAO from the Canberra Packet Radio Group Technical Symposium, on the AX.25 protocol, taking people through the structure of the packet frames that they transmit and on to describe a typical packet connect sequence.

AX.25 Amateur Packet Radio Link-Layer Protocol

AX.25 has been the standard link layer protocol for use by amateurs since 1982. It was originally defined in the paper *"Amateur Packet Radio Link Layer Protocol — ARRL 1982"* and since revised with version 2.0 in 1984 and *"AX.25 Link Access Protocol — Amateur Packet Radio Version 2.2"* in 1993. I am not aware as to whether any of the changes in this last paper have been implemented.

AX.25 was designed to be able to establish a data link independent of any other level (it can function as all levels from Presentation to Data-Link), to work in a full or half duplex environment, to allow connections between independent individual stations and between individual stations and a multi-port station all on a shared channel, to allow multiple link layer protocols and link layer connections, to allow that the link is balanced (ie neither station is a controlling or master station, therefore any station can establish communication with any other station, assuming a physical path exists).

AX.25 transmissions are sent as small packets of data called packets or, more correctly, frames. The basic frame is synchronous (no start or stop bits) and conforms to HDLC (high level data link control). Each frame is constructed as follows.

For U (unnumbered) and S (supervisory) frames, see Fig 1.

Flag	Address	Control	FCS	Flag
01111110	112/560 bits	8 bits	16 bits	01111110

Fig 1.

For I (information) and UI (unnumbered information) frames, see Fig 2.

Flag	Address	Control	PID	Information	FCS	Flag
01111110	112/560 bits	8 bits	8 bits	N*8 bits	16 bits	01111110

Fig 2.

The **Flag Field** contains a unique bit pattern (six 1s in a row). This can never happen within the frame, as HDLC requires "bit stuffing" to ensure clock integrity at the receiving end; if five 1s occur in a row, a zero is inserted into the data stream. At the receiving end, if five 1s are received, the next zero is deleted. Therefore, if six 1s are received it can only be a flag. The only other time that more then five 1s can appear in a row is in a frame abort, which is a minimum of 15 1s with no intervening 0s.

The **Address Field** contains the destination address, the source address and up to eight digipeater addresses to facilitate user defined routing. All addresses are seven bytes long — six uppercase/numeral ASCII, plus one SSID, all shifted one bit left to accommodate address termination bit in the least significant bit.

The **Control Field** identifies the type of frame and to control level two (data-link) functions. Is the frame an Information, Supervisory or Unnumbered Frame?, Send and Receive sequence numbers, and bits classifying what type of S or U frame it is in those cases.

The **PID Field** (Protocol Identifier field U/I frames only) indicates the type of layer 3 protocol (if any) — see Fig 3.

L3 Type	Binary	Hex
Escape	11111111	FF
No L3	11110000	F0
AX.25 L3	xx10xxxx	
AX.25 L3	xx01xxxx	
NET/ROM	11001111	CF
ARP	11001101	CD
IP	11001100	CC

Fig 3.

The **Information Field** (1 to 256 (AX.25 v2.0)/default of 256 (AX.25 v2.2) bytes of information) contains the actual data to be communicated to the other end. This field exists only for I, UI and FRMR frames. The I field may contain control information for other protocols but, as far as AX.25 is concerned, this is all data (FRMR frames being a special case).

The FCS Field (Frame Check Sequence) — the last sixteen bits before flag are a HLDC conformant CRC check used to ensure validity of the frame.

The Flag Field — see above.

Frame Types

"rrr" is the receive sequence number, and "sss" is the send sequence number. The bit marked P/F/E is used to indicate that a command requires an immediate response (poll) or that this response is to a poll (final). 0s and 1s identify the frames.

Numbered Information Frames

rrrPsss0

I — Information Frames are used to transfer user information (data). Send and receive sequence numbers are used to detect missing frames.

Unnumbered Information Frames

000E0011

UI — Unnumbered Information are used to transfer information outside of the normal flow control. These frames are not acknowledged by the AX.25 protocol, and may either be unimportant (beacons) or part of a higher protocol that supports its own control (TCP/IP in datagram mode).

100F0111

FRMR — Frame Reject. If an invalid frame is received, ie a frame received out of sequence, an invalid command, or an invalid information length, basically an error has occurred that cannot be corrected by resending the offending frame. An I field is included to give more detail of the error encountered.

Numbered Supervisory Frames

rrrE0001

RR — Receiver Ready and is able to receive more I frames, acknowledge correctly received I frames to N(r-1), clear a previous RNR condition.

rrrE0101

RNR — Receiver Not Ready — no more I frames can be accepted at present. Will acknowledge I frames received correctly to date to N(r-1)

rrrE1001

REJ — Reject is used to request retransmission from frame N(r). Frames to N(r-1) are acknowledged.

Unnumbered Supervisory Frames

001P1111

SABM — Set Asynchronous Balanced Mode (Connect) — establishes a LAPB (Link Access Protocol — Balanced)

connection between the parties and will be acknowledged by a UA or DM.

010P0011

DISC — Disconnect. Closes the link, should be acknowledged by a UA.

011F0011

UA — Unnumbered Acknowledge. Used to acknowledge a SABM or DISC.

000F1111

DM — Disconnect Mode. Used to indicate that the station is in a disconnected mode. When disconnected this is sent in response to any frame other than a SABM or UI frame. It is also sent in response to a SABM if a connection cannot be accepted a present.

Mention was made above of both numbered and unnumbered frames. You will recall that one function of the Network layer of the model is to detect the loss of an information packet. AX.25 handles this by keeping track of the frame number of the last sent and last received frames and updating these counters accordingly. The system used is a modulo 8 (0-7 or three bits) counter for each of the send and receive numbers — these bits form part of the control field. This allows up to seven frames to be outstanding (sent but not yet acknowledged); the actual number permitted is controlled by the MAXFRAME parameter. I frames contain both a send and receive number; S frames contain a receive number only; and U contain neither.

Typical AX.25 Contact Scenario

Fig 4 shows a sample of a contact established between two adjacent (no digipeaters involved) stations, A — VK1ABC and B — VK1DEF. Callsigns are for example only.

Here is an explanation of the contact.

1. Station A requests a link establishment with Station B.
2. Station B acknowledges and accepts the connection (it would have replied with a DM if the connection was refused).
3. Station A sends an information frame to B (0).
4. B sends back an information frame, and also acknowledges the one from A (0).
5. A sends another information frame to B (1).
6. B acknowledges that frame.
7. A sends another I frame to B (2).
8. B sends a receiver not ready which acknowledges the last received frame.
9. After a timeout, A asks if B is ready yet.
10. B says still not available.
11. After another timeout, A asks if B is ready yet.
12. B say OK this time.
13. A sends an Information frame (2).
14. B returns an Information frame which also acknowledges the last received frame.

| Frame | VK1ABC | | | VK1DEF | |
	Address	Info		Frame	Address	Info
SABM	VK1ABC/VK1DEF		-->			
			<--	UA	VK1DEF/VK1ABC	
I(0/0)	VK1ABC/VK1DEF	Hello	-->			
			<--	I(0/0)	VK1DEF/VK1ABC	Hello to you too
I(1/1)	VK1ABC/VK1DEF	More text	>			
			<	RR(1)	VK1DEF/VK1ABC	
I(1/2)	VK1ABC/VK1DEF	Still more txt	-->			
			<	RNR(2)	VK1DEF/VK1ABC	
RR(1)	VK1ABC/VK1DEF		-->			
			<--	RNR(2)	VK1DEF/VK1ABC	
RR(1)	VK1ABC/VK1DEF		-->			
			<	RR(2)	VK1DEF/VK1ABC	
I(1/2)	VK1ABC/VK1DEF	Still more text	-->			
			<--	I(3/1)	VK1DEF/VK1ABC	Goodbye then
I(2/3)	VK1ABC/VK1DEF	before you go	>			
I(2/4)	VK1ABC/VK1DEF	I have some	-->			
			<	RR(5)	VK1DEF/VK1ABC	
I(2/5)	VK1ABC/VK1DEF	more info that	-->			
I(2/6)	VK1ABC/VK1DEF	I want you to	-->			
			<--	RE(6)	VK1DEF/VK1ABC	
I(2/6)	VK1ABC/VK1DEF	I want you to	-->			
			<--	RR(7)	VK1DEF/VK1ABC	
I(2/7)	VK1ABC/VK1DEF	hear that s all	>			
			<--	I(6/2)	VK1DEF/VK1ABC	Thanks and toorah
I(3/0)	VK1ABC/VK1DEF	Bye then	-->			
RR(3)	VK1ABC/VK1DEF		-->			
			<	RR(1)	VK1DEF/VK1ABC	
UA	VK1ABC/VK1DEF		<--	DISC	VK1DEF/VK1ABC	

Fig 4.

15. A sends an information frame that acknowledges the last received frame (3).
16. A sends another frame straight away (4).
17. Having received 2 I frames from A, B acknowledges the last one which, in fact, acknowledges both.
18. A sends an I frame (5).
19. A sends an additional I frame (6).
20. B rejects frame 6 (acknowledging frame 5)
21. A resends requested I frame (6).
22. B acknowledges the frame with an I frame of his own.
23. A sends yet another I frame (7), also acknowledging B's last frame.
24. B acknowledges — note the wrap around to 0 (modulo 8).

25. The next I frame that A sends is numbered (0).
26. B acknowledges.
27. After a timeout, A checks to see if B is alive.
28. B acknowledges.
29. B initiates a disconnect sequence.
30. A acknowledges the disconnect.

Conclusion

Next month, John takes a look at channel access protocols and how packet stations decide when they can transmit, as we continue this series on the basics of AX.25 Amateur Packet Radio.

*C/o GPO Box 1234, Adelaide SA 5001
Packet: VK5ZWI@ VK5TTY#ADL.#SA.AUS.OC
Internet gwillis@eleceng.adelaide.edu.au
                                                                    ar

Repeater Link

Will McGhie VK6UU*

Feedback

There has been some feedback on the February comments in *Repeater Link* about communications within the WIA. These comments have all been in favour of some e-mail system between WIA committee people. Communications between WIA committee people in my opinion, and in the opinion of several others, needs improving. With such a wide-spread bureaucracy within the WIA, keeping informed, in order to do the job you volunteered for, is difficult.

I would like to see an e-mail system for the WIA committee people, and a separate one for members, so as to forward their thoughts easily to their WIA. If you agree, then discuss the idea with your Divisional Council and find out their views on the idea. If your Division supports the idea, then it becomes your Division's policy. Your Divisional Councillor then forwards this to the Federal WIA. If enough Divisions support the idea, then it is adopted as WIA Federal policy. From there progress can be made.

You may wonder what this topic has to do with voice repeaters? For many years I have been involved in repeater development and have found that the biggest problem repeater development has in Australia, is the multiplicity of regulations. Bringing about changes to these regulations is very time consuming and frustrating. After all this time I now have some ideas where some of the problems are. They are within the WIA

and our poor communications. Until this problem is fixed, change will require dedicated people to spend a great deal of time, effort, and some of their own money, to struggle to bring about better regulation. Being connected effectively can result in efficient progress.

Link Timer

Here in VK6 we have a couple of repeaters that are on major highways, but have few or no amateurs living in the service area. These repeaters are mainly for amateurs travelling through the service area. The problem is that, unless there is another amateur in the service area, few contacts are made on these repeaters. One such repeater is at Cataby, some 160 km north of Perth on the Brand Highway. This area is sparsely populated, with wheat and sheep farming being the main activity. However, many amateurs travel through this area on their way north to Geraldton and places further on. This highway is the main road north from Perth.

Linking this repeater has long been on the list of things to do. The equipment is now nearing completion and will be an off-air link to a Perth repeater on 70 cm. However, the site is solar powered and linking this repeater at Cataby to Perth will see greatly increased activity. Much of this activity will be in the Perth area and linked to Cataby when there are no amateurs in the Cataby area. The Cataby repeater will be transmitting for many hours each week, using limited solar power, for no purpose.

The circuit shows a way around the problem. When activity from Perth is fed up the link, Cataby only transmits the first few seconds. An amateur in Perth calling is heard on the Cataby repeater. If another amateur in Perth replies, this will also be heard on the Cataby repeater. Once the contact is under way between these two amateurs, only the first few seconds of each over is heard on the Cataby repeater. Most of the contact will not be re-broadcast. The start of each over in Perth is heard if you are listening on the Cataby repeater, but after, say, 10 seconds the rest of that over is timed out. The result is a large saving in solar power when no amateurs are listening on the Cataby repeater. I hope you followed that description.

What happens if there is an amateur in the Cataby service area? This amateur hears the amateur in Perth via the link being re-broadcast on the Cataby repeater. This amateur normally has three options. To reply, not to reply or listen to any amateur between the amateur who called and any amateur in the Perth area who responded to the original call.

Operation

Let's look at the first option, to reply. When the amateur responds to a call that originated in Perth, a five minute timer is set that now allows re-broadcast of the Perth traffic. The Cataby repeater is now configured to re-broadcast any link traffic for five minutes. This timer is reset every time a signal is received on Cataby's repeater receiver. Normal operation in the Cataby area would keep resetting the five minute timer. All that is required is an input signal direct to the repeater's receiver every five minutes or less to add another five minutes. The amateur in the Cataby service area does this resetting of the five minute timer simply by being part of a normal contact. Once the contact has ended, the five minute timer times out and the Cataby repeater goes back to the 10 second timer.

The second option of not responding to a linked call from Perth results in normal operation as the station calling is heard, and with no reply from any amateur, all is as would be expected.

The third option of not responding to a call but another station in the Perth area responding, results in the 10 second window timing out the link once the contact is under way. The original call and response is heard but once the contact is under way, only 10 seconds at the start of each over is heard. The normal response of most amateurs on

hearing a signal time out, is to push the PTT button. This now sets the five minute timer in operation and for the next five minutes the contact between the two amateurs in Perth is re-broadcast via the Cataby repeater.

If at any time the amateur in the Cataby service area wants to join the contact, normal operating procedures are all that are required. The Cataby amateur, by joining the contact, now resets the five minute time-out every time he or she has an over.

Contact between two amateurs, both in the Cataby service area, results in normal five minute time-out operation of the Cataby repeater, reducing long transmissions from Perth being re-broadcast on the Cataby repeater, for no purpose when there is no one to listen to the transmission. The end result is a considerable saving in solar power with no limitations on normal operation.

The Circuit

The circuit that does all this is rather simple. Two NE555 timer ICs are used. One is set as a 10 second monostable, T1, and the other is set as a five minute re-setable monostable. The timing can be set to fit the type of operation. 10 seconds may be a little long and five minutes a little short. Component value changes can be made for your particular requirements. The 5 M resistors are changed to make this adjustment. Make sure that the 100 μF timing capacitor on pin 6 of T2 is a low leakage type.

The inputs to both timers are controlled by the mute logic from the link receiver and the repeater. When the mutes closed, the inputs on pins 2 and 3 are high. Mutes open on either receiver, results in pins 2 or 3 going low. If your mute logic is the other way around, then remove TR1 and TR3.

The outputs of the timers are 'or'ed together to turn on TR5 and hence operate the relay. The circuit need not drive a relay but simply provide a logic output from the timers. The idea is there; modifications to suit your requirements are easy enough. The logic output, or relay output, controls the repeater transmission.

Values

Are you wondering why resistors doing similar jobs are different in each timer circuit? For example, the input resistors from pin 2 and pin 3 are 330 k and 220 k. It makes for easier identification and fault finding. I learnt my lesson once by making a circuit using mainly 10 k resistors. What a nightmare trying to fault-find. Which 10 k resistor is that?

Spelling

Not being a good speller, and relying heavily on the spell checker, I still have problems with spelling from time to time. I do my best and hope the *Amateur Radio* editor can touch up the spelling when required. Technical writing has many problems, as many of the words are not in the spell checker or dictionary. I had problems with two words this month. When two logic levels are 'or'ed together, how do you spell it? Is it or'ed or ored or or'd? Another example is re-setable. To re-set a timer. I gather there is no such word, but there it is anyway. *(As you can see, we picked a fourth possibility, 'or'ed'! If "re-setable" is not in the dictionary, it ought to be! Ed)*

21 Waterloo Crescent, Lesmurdie 6076 VK6UU @ VK6BBR

ar
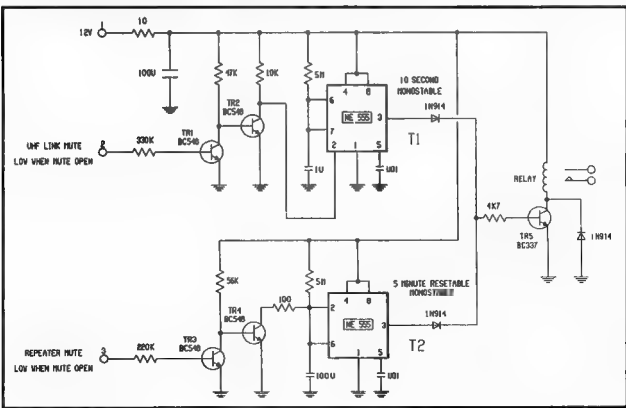
Pounding Brass

Stephen P Smith VK2SPS*

Every couple of years the IARU Region 1 organises a major Telegraphy Competition and designates a particular European country to host this prestigious event.

At the IARU Region 1 championship in Belgium in 1991, some 70 participants from nine different countries competed. The Hungarian Radio Amateur Society (MRASZ) hosted the last Championships which took place only recently in Siofok, Hungary.

Lacy HA3NU, IARU Region 1 coordinator, was in charge for the first High Speed Telegraph World Championship. All major radio societies belonging to the three IARU Regions around the world were invited to participate.

According to the official rules, for the competition to have "World Status" (in this case it was the first time it has been given this title), at least three or more continents must attend, otherwise it will be designated as The European Championships, providing five or more Europeans take part. The recent Championships were well represented with 15 countries from three continents taking part, including Canada, Korea and Japan who were participating for the first time.

The next World Championships will take place in two years time in Bulgaria, the venue being unknown at this time.

Sign up a new WIA member today — we need the numbers to to protect our frequencies and privileges

Here is a brief summary of the revised rules for the World Championship.

Teams and Categories

Each national team may comprise up to twelve members, representing six categories. There shall be no more than two team members within each category as follows: Seniors (males older than 20 years), Juniors (males up to 20 years), Senior YLs (females older than 20 years), Junior YLs (females up to 20 years), Old Boys (males 45 years or older), and Old Ladies (females 40 years or older).

Each team will have a designated team leader who, if also a competitor, must be at least eighteen years of age. A trainer, interpreter, and HST international class referee, serving as a member of the international jury, may accompany each team.

Tests

The championships comprises seven tests; (a) reception of letter messages, (b) reception of figure messages, (c) transmission of letter messages, (d) transmission of figure messages, (e) reception of mixed messages, (f) transmission of mixed messages, and (g) the radio amateur practising test, based on the RUFZ callsign receiving program devised by DL3DZZ.

During the reception transmission tests, telegraphy speed will be measured by the Paris system. The sample of transmission messages comprises fifty groups, each of five characters.

Speeds

Letter and mixed reception messages are sent at a progressively increased speed, starting with 100 marks/minute (marks mean characters) for letters and 150 marks/minute for figures; competitors withdrawing as the speed becomes too high for them. Messages may be recorded by hand (using any symbols desired) or by typewriter. Messages copied on the contestant's own paper must be re-copied on to the official forms after the test.

For transmission, either straight or electronic keys, single or twin-paddle (adjusted to a dot/dash ratio of 1:3), may be used.

Radio Amateur Practising Test

The radio amateur practising test shall be established by help of PC computers. The RUFZ callsign copy program requires competitors to make two attempts at receiving 50 callsigns (and typing them back onto the computer keyboard), and the best attempt is taken for scoring.

The overall best performance scores 100 points and other entrants are scored proportionally lower relative to the 100.

Individual Awards

The title of Individual Champion in each of the six categories of the contest is awarded to the competitors with the highest scores calculated as follows: (1) reception (sum of scores for the three reception tests), (2) transmission (sum of scores for the three transmission tests), (3) radio amateur practising test (score gained at the best attempt), and (4) total of the above scores.

In the case of a tie, a result will be judged on the best result for transmission of messages. The winners of each category will be awarded the title "World Champion" or "European Champion" as appropriate and will receive Gold Medals and Certificates. Those gaining second and third places will be awarded Silver and Bronze Medals respectively, and Certificates. Those gaining 4th-6th places will be awarded Certificates.

Team Awards

The position of the national teams in the championships shall be decided by the total points scored by a maximum of six team members (ie those having the best scores in each of the six categories). The team gaining first place will win the title "World Team Champion" or "European Team Champion" as appropriate. The team will be awarded a Cup and a Certificate and all team members will receive Gold Medals and Certificates. Teams gaining second and third places will be awarded Certificates. Members of the teams will receive Silver and Bronze Medals respectively, plus Certificates. Teams gaining 4th-6th places will be awarded Certificates.

Entering the Championships

The organising society of the championships invites all national IARU member societies to participate in the championships.

The rules state that each competitor shall have a radio amateur or SWL

Errors	0	1	1	2	2	3	3	3	3
Corrections	1	2	3	4	5	6	7	8	10
Multipliers	1	0.95	0.9	0.85	0.8	0.75	0.7	0.65	0.6

licence, and agreement of his/her national society to take part in the contest. Anyone interested in joining their national team for the HST Championships should therefore contact their national society to find out what arrangements it is making to select a team or send other competitors.

If a national society decides not to send a national team or other competitors, then applications may be made by (for example) representatives of a CW club, with the permission of the national society.

The Wireless Institute of Australia has never entered a team in the HST Championships. Perhaps the society should look into the matter and come up with some ideas which would support this prestigious event.

Being geographically isolated from the rest of the world, I believe, is possibly part of the problem. However, as the event only comes around every two years, I feel there would be ample time to organise a suitable team/teams from interested parties, clubs, etc throughout Australia. If we could organise some form of competition, perhaps an inter-Division challenge with winners from this competition (with the backing of our own Wireless Institute) being selected for the Overseas Championships.

I hope to write shortly to all Divisions and perhaps get the ball rolling.

Next month we will start our Key Construction project series. I have just received the technical drawings from the maker and they can be reproduced much clearer than my previous drawings.

*PO Box 361, Mona Vale NSW 2103

ar

VHF/UHF — An Expanding World

Eric Jamieson VK5LP*

All times are UTC.

The Great Tropospheric Opening (Part 1)

It was destined to occur. During February, the southern portion of Australia enjoyed a prolonged period of outstanding VHF/UHF propagation. The fact that something may happen, first became evident on 8/2/96 when a high pressure cell moved into the Great Australian Bight at 15 knots and a pressure gradient of 1029 hPa.

The weather map for 14/2/96 showing the elongated high pressure system over the Southern Ocean. The added lines indicate the paths which made contacts possible, firstly between Roger VK5NY at Mount Wilson to Torbay and Perth, with a few contacts either side of the line; and secondly, the main path between Perth and Mount Gambier, and on to Melbourne and a little beyond, which received the assistance of an inversion. Very few contacts were made either side of that line. No contacts were made to Tasmania. Secondary contacts were made between Esperance/Albany/Perth.

In addition, a complex series of low pressure cells was stationary over the Tasman Sea, being blocked by a high pressure cell over New Zealand.

The first contact, of 1760 km on 144 MHz, was between Colin VK5DK at Mount Gambier and Bill VK6AS at Esperance at 1255 on 10/2, with 5x9 signals. By 11/2 the high was positioned to permit contacts on 144 MHz between VK6AS, VK6APZ and VK6ATS at Esperance PF06 and VK3ZQB at Port Fairy QF11, a distance of 1890 km. In fact, Russell VK3ZQB spanned that path to work VK6ATS, who used a 1/4 wave whip vertical!

By 12/2 the high had intensified to 1031 hPa and was stationary over the Bight. VK3ZQB worked VK6KZ/p at Torbay OF84tw, 2187 km, about 30 km west of Albany on 144 and VK5NY on 1296 MHz. By now Colin VK5DK and Tim VK5AV from Mount Gambier also were working to Esperance and Albany.

This high moved east on 13/2 with a weak front over Perth. However, a second high pressure cell of 1028 hPa was moving east behind the front, and suddenly stations in Perth were being worked on 144 MHz.

On 14/2 the cold front had slipped south east and the two highs, one over Victoria and other south of Perth, had linked to form an elongated area of high pressure extending from Perth to the Tasman Sea. That morning an intense inversion was experienced, situated well down in the ocean from southern Australia. Trevor VK5NC, while travelling on the freeway at Crafers near Mount Lofty, said that the inversion was clearly visible in the Southern Ocean. It remained there for several days providing some of the best VHF/UHF conditions ever experienced on that long path up to 3000 km.

By 16/2 the high pressure cell had moved east with the cell centre over the Tasman Sea. A ridge extended across southern Australia to link with a high of 1030 hPa south west of Perth. The pressure of the ridge was about 1016 hPa and, because of this lower pressure, propagation was on the decline. Stations were worked on 17/2 but not to the extent of the previous days.

My thanks to Russell VK3ZQB for filling the gaps in my meteorological information and for a series of weather maps. Unfortunately, I could not use these as they suffered lack of definition when faxed. However, David VK5KK was able to prepare several good maps, one of which appears in these columns.

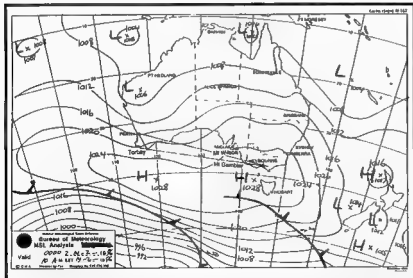As the result of this sustained high pressure system, the following achievements were made:

On 16/2 at 1614, Trevor VK5NC in Mount Gambier QF02je worked VK6AO in Perth OF78 on 1296 MHz at 5x5 for a new VK5 record, approx 2360 km. This was also the first 1296 MHz intrastate contact from Perth and a VK6 record. Cec VK6AO was roused from bed near midnight local time by a phone call from Alan VK6ZWZ who had been in QSO with VK5NC on 144 MHz. Cec runs about 200 watts to a water-cooled 2C39 PA with a long loop-Yagi antenna, and a GaAsFET masthead pre-amp on receive. The exciter is a VK5 type transverter with a M57762 intermediate driver.

On 17/2 at 0200, VK5NC in Mount Gambier QF02je worked VK6HH in Perth OF78 on 432 MHz at 419 for a new VK5 record, approx 2360 km. VK5NC also worked VK6ZWZ in Perth on 432 and this may be a slightly greater distance.

John Martin VK3KWA, who keeps the distance records, will need to pore very carefully over the Australian landscape to decide who worked the longest distance as there is little to choose between VK5NC and VK5DK in Mount Gambier and also at the other end for some of the Perth stations!

Comments from the Operators

Wal VK5WX/p at Torbay: I was thrilled to have so many stations active on 10 GHz looking west! I have a feeling that the higher frequencies do not propagate well to Torbay because of the long narrow high pressure cell with central pressure not particularly high, eg 1024 hPa on Thursday 15/2 compared with 1030 hPa when Roger VK5NY and I bridged the path last year.

I was grateful to Trevor VK5NC for coming on 10 GHz so soon after returning from Adelaide, and his 1296 MHz contact with Cec VK6AO — he must have had no more than three hours sleep that night! Great to see Cec VK6AO fulfilled his desire to work east on 1296 MHz — he has put a lot of technical excellence in his station with that goal in mind

I was amazed at the almost continuous absence of the Adelaide beacon VK5VF on 144.450. Also looked for it on 432, 1296, 2403 and 10368 from time to time without success.

Alan VK6ZWZ Perth: While in contact with Trevor VK5NC on 16/2 at 1535, he mentioned copying the beacon VK6RPH on 432.460. I informed him

that on 1296 VK6RPH was low in frequency (about 1296.453 due to a technical problem aggravated by the day's extremely high temperature). Trevor heard the beacon at S2 but we were unable to make contact on 1296. I phoned Cec VK6AO, who is better equipped, and he proceeded to work Trevor VK5NC on 1296, at which point I could hear Trevor on QSB peaks.

Don VK6HK Perth: What an incredible week of VHF/UHF propagation from Perth to VK5 and VK3. The Mount Gambier beacon VK5RSE on 144.550 was an outstanding marker for this series of openings. Nothing was heard by me of any of the Adelaide beacons or stations north of VK5NY on any of the five days, although VK6ZWZ reported hearing VK5VF weakly on one occasion.

Best DX for me was VK3AUU at Drouin QF31, east of Melbourne at 2223 on 15/2. This is a preliminary distance of 2816 km and is thought to be a new VK6 two metre tropospheric propagation record.

VK3ZQB at 2206 on 15/2 was also a great QSO for me, being my first VK3 on 432 MHz. This week saw the first ever 432 MHz QSOs from Perth to VK3. Not sure who made the first, probably VK6AO at 2158 on 14/2. (VK6KRC worked VK3ZQB at 2132 on 14/2 ... de VK5LP)

Russell VK3ZQB said: VK3ZQB/p at Port Fairy and Allen VK3XPD/p at Mount Dandenong attempted to contact VK6KZ/p at Torbay, west of Albany on 3 cm, on the morning and evening of 13/2 and the morning of 14/2 until 2100, without success.

Portable stations were set up by VK5NY/p at South End QF02, VK5KK/p Robe PF92, VK3XPD/p Mt Dandenong QF21, and VK3ZQB/p Cape Bridgewater QF01, in an effort to communicate with VK6KZ/p at Torbay OF84tw. From 1050 to 2130 (except 1630 to 1730 — they had to sleep sometime!), on each half hour attempts were made for contacts on 3 cm without success, although a number of contacts ensured on 144, 432 and 1296 MHz.

Notwithstanding the large number of contacts associated with this period of enhanced propagation, it is interesting to note that the area covered was relatively narrow at both ends, with Perth to Mount Gambier being the optimum for sustained contacts.

The Adelaide beacon VK5VF on two metres was rarely heard in the west and, as far as is known, no one from Adelaide

worked Perth, although VK5KK and VK5RO worked VK6KZ/p on 144 on 12/2 but only at 5x2. VK5NY from his mountain-top site near Mount Wilson worked VK6ZWZ at 5x5 and VK6HK 5x6 on 14/2 and VK6HK on 15/2 at 2x1! Here at Meningie I heard no signals from Albany/Torbay or Perth or their beacons. VK6AS at Esperance was heard weakly and briefly for a few moments on 14/2.

Here are details of those involved in the tropo opening, with the stations progressing from the most easterly to other intermediate positions to the most westerly at Perth. Distances shown are approximate due to lack of detailed latitude and longitude information or locator squares to six places not being available; nevertheless, they are a fair indication of the extent of long distance contacts.

David VK3AUU Drouin QF31
Adam VK3ALM North Dandenong QF22
Jim VK3II Melbourne QF22
Alan VK3AL Melbourne QF22
VK3ZUC
Allan VK3XPD Burwood QF22
Ross VK3ACX QF22
Ron VK3AKJ Melbourne QF22
Ken VK3DQW Geelong QF21
Charlie VK3BRZ Geelong QF21
Mike VK3RZ Melbourne QF22
Ron VK3AFW Melbourne QF22
Russell VK3ZQB Port Fairy QF11
VK3ZQB/p Cape Bridgewater QF01
Trevor VK5NC Mt Gambier QF02
VK5NC/p Cape Northumberland QF01
Colin VK5DK Mt Gambier QF02
Tim VK5AV Mt Gambier QF02
Roger VK5NY Mt Wilson PF94
Roger VK5NY/p South End PF02
Phil VK5AKK Stirling PF95
Colin VK5RO Adelaide PF95
David VK5KK Adelaide PF95
David VK5KK/p Robe PF92
Tom VK5EE Mt Gambier QF02
Bill VK6AS Esperance PF06
Peter VK6APZ Esperance PF06
Graeme VK6ATS Esperance PF06
Bob VK6BE Albany OF84
Frank VK6DM Albany OF84
Wally VK6WG Albany OF84
Wal VK6KZ/p Torbay OF84tw
Darryl VK6KDC Manjimup OF85
Cec VK6AO Perth OF78
Don VK6HK Perth OF78
John VK6JJ Perth OF78
Ross VK6KAT Perth OF78
Bob VK6KRC Perth OF78
Al VK6ZAY Perth OF78
Alan VK6ZWZ Perth OF78
Brad VK6AH Perth OF78
Steve VK6SQ Perth OF78

Time	From		To	Band	Report	Dist
1255	VK5DK	—	VK6AS	144	5x9	1760

11/2/96

Time	From		To	Band	Report	Dist
1310	VK5DK	—	VK6AS	144	5x9	1760
1325	VK5KK	---	VK6BE	144	5x3	2036
1333	VK5AV	—	VK6BE	144	5x1	2036
1345	VK5AV	—	VK6AS	144	5x1	1760
1500	VK3ZQB	—	VK6AS	144	5x9	1890
1503	VK3ZQB	—	VK6APZ	144	5x9	1890
1506	VK3ZQB	—	VK6ATS	144	4x1	1890

12/2/96

Time	From		To	Band	Report	Dist
0952	VK5AKK	—	VK6KZ/p	144		1907
	VK5AKK	—	VK6KZ/p	432		1907
1031	VK5KK	—	VK6KZ/p	144	5x2	1923
1052	VK3ZQB	—	VK6KZ/p	144	5x2	2187
1059	VK3ZUC	—	VK6KZ/p	144	5x1	
1103	VK3AUU	—	VK6KZ/p	144	5x5	2540
1115	VK5DK	—	VK6KZ/p	144	4x1	2187
1200	VK5DK	—	VK6AS	144	5x9	1760
1204	VK5RO	—	VK6KZ/p	144	5x2	1907
1208	VK5DK	—	VK6HK	144		2360
1222	VK3ZQB	—	VK6KZ/p	144	5x2	2187
1230	VK3XPD	—	VK6KZ/p	144		2440
1245	VK5DK	—	VK6KZ/p	144	5x7	2066
1250	VK5DK	—	VK6KZ/p	432	5x2	2066
2328	VK6AS	—	VK6HK	144		600
2335	VK3ZQB	—	VK5NY	1296	5x7	380
2343	VK6KZ/p	—	VK6HK	144		400

13/2/96

Time	From		To	Band	Report	Dist
0145	VK5DK	—	VK6AS	144	5x9	1760
0803	VK3ZQB	—	VK6KZ/p	144		2187
0905	VK5DK	—	VK6KZ/p	144	5x3	2066
1130	VK3ZQB	—	VK6KZ/p	144	5x2	2187
1145	VK5DK	—	VK6AO	144	5x6	2360
1205	VK3ZQB	—	VK6AO	144	5x1	2490
1210	VK5DK	—	VK6ZWZ	144	5x3	2360
1215	VK5DK	—	VK6ZWZ	144		2066
1215	VK6AS	—	VK6ZWZ	144		600
1232	VK3ZQB	—	VK5NY	432	5x9	318
1310	VK5DK	—	VK3RZ	144		375
2328	VK6KZ/p	—	VK6ZWZ	144		2360
2343	VK3ZQB	—	VK6ZWZ	432	400	2490

14/2/96

Time	From		To	Band	Report	Dist
0002	VK3ZQB	—	VK3XPD/p	1296	5x3	
0610	VK3ZQB	—	VK6APZ	144	5x9	1890
0611	VK3ZQB	—	VK6AS	144	5x6	1890
1000	VK3ZQB	—	VK6KZ/p	144		2187
1030	VK3ZQB	—	VK6APZ	432	5x9	1890
1035	VK3ZQB	—	VK6KZ/p	432	5x2	2187
1100	VK3ZQB	—	VK6KZ/p	144	5x1	2066
1301	VK5AV	—	VK6APZ	144	5x3	1760
1145	VK5DK	—	VK6DM	144	5x6	1760
1148	VK5DK	—	VK6APZ	144	5x9	1760
1149	VK5DK	—	VK6AS	144	5x6	1760
1150	VK5DK	—	VK6APZ	432	5x6	1760
1155	VK3ZQB	—	VK6WG	144	5x7	2157
1155	VK3ZQB	—	VK6WG	432	5x7	2036
1235	VK3ACX			1296	5x2	
1236	VK3ZQB	—	VK3XPD/p	1296	5x2	
1253	VK3AKJ	—	VK6KZ/p	144		2440
1306	VK5NY	—	VK6KZ/p	144	5x1	1912
1322	VK5AV	—	VK6APZ	144	5x3	1760
1400	VK5AV	—	VK6AS	144	5x1	1760
1410	VK5DK	—	VK6KZ/p	144		2066
1415	VK5DK	—	VK6ZWZ	144	5x1	2360
1515	VK6APZ	—	VK6ZWZ	144		600
2100	VK3AUU	—	VK6ZWZ	144		2816
2110	VK5AV	—	VK6ZWZ	144	5x3	2360
2113	VK3ZQB	—	VK6ZWZ	144		2490
2115	VK3ZQB	—	VK6KZ/p	144		2187
2116	VK5NY	—	VK6ZWZ	144	5x7	1912
2130	VK3ZQB	—	VK6AS	144	5x9	1890
2131	VK3XPD	—	VK6KZ/p	144		2440
2132	VK3ZQB	—	VK6KZ/p	432	5x2	2490
2133	VK5NY	—	VK6ZWZ	144	5x9	2180
2136	VK3ZQB	—	VK6KRC	144	5x9	2490
2137	VK6APZ	—	VK6ZWZ	144		600
2150	VK5DK	—	VK6APZ	432	5x9	1760
2158	VK5DK	—	VK6AO	432	5x8	2360
2201	VK3AUU	—	VK6ZWZ	144		2540
2202	VK3ZQB	—	VK6ZWZ	432	5x2	2490
2205	VK3ZQB	—	VK6HK	144		2490
2206	VK3ZQB	—	VK6AO	144	5x7	2490
2210	VK3ZQB	—	VK6HK	144	5x4	2490
2220	VK5DK	—	VK6HK	144	5x7	2360
2229	VK5NY	—	VK6HK	144	5x6	2180
2314	VK6AS	—	VK6HK	144	5x7	600

Thanks to VK3ZQB, VK5AV, VK5DK, VK5KK, VK5NC, VK6AO, VK6KZ, VK6HK and VK6ZWZ for the supply of appropriate information. Part 2, covering 15/2, 16/2 and 17/2 will appear next month.

New Zealand to Australia

Last month's report from Cliff ZL1MQ recorded known 50 MHz contacts to 5/1/96. Since then, Cliff reports that the band has been open between the two countries on 27 occasions between 6/1/96 and 3/2/96, the only days not open being 31/1 and 1/2! Stations worked were VKs 1MJ, 2APG, 2DVC, 2EMA, 2FZ/4, 2IBT, 2MZ, 2YLO, 2ZJR, 3ALZ, 3AMJ, 3AMQ, 3AMS, 3AYO, 3AZY, 3DEM, 3DUQ, 3DUT, 3OT, 3OW, 4ABW, 4AFL, 4ALM, 4APG, 4AR, 4ARN, 4BKM, 4FNQ, 4GPN, 4JH, 4KK, 4KMA, 4PU, 4RC/5, 4UGC, 4XG, 5AKK, 5AYD, 5BC, 5KTZ, 5LP, 5NA, 5ZNC, 6AKT, 6BE, 6JJ, 6KRC, 6KZ, 6RO, 6YU, 6ZWZ, 7AF, 7JG, 7LZ, 7RR, 7XR, 7ZUF and 8RH by ZLs 1ADP, 1HI, 1MQ, 1TMF, 2AAA, 2AGI, 2AQR/3, 2KT, 2TPY, 3AAV, 3ADT, 3ADT, 3NE, 3TIC, 3TLG, 4LV, 4NV, 4TBB and 4TBN.

FK8EB was worked by ZL2AGI and ZL2KT on 10/1. On 12/1 and 15/1 VK9YQS Lord Howe Island QF98 was worked by ZL2KT and ZL2AGI. Doug ZL9YQS may go to Macquarie Island late in 1996. ZL2TPY worked JE2DWZ on 14/1 and ZL1MQ, ZL2AGI and ZL3NE worked JH6VXP on 8/2.

A new six metre beacon is operating from Christchurch RE66 with the call of ZL3SIX on 50.020 MHz.

On two metres the band was open on 9/1, 11/1, 13/1, 15/1, 20/1, 21/1, 24/1 and 27/1, or eight occasions. VKs worked were 1VP, 2APG, 2BA, 2DVZ, 2DXV, 2FZ/4, 2XKE, 2ZAB, 2ZXC, 3DEM, 3DUT, 3TMP, 3XRS, 4ABW/2, 4APG and 7XR, the first VK7 on two metres. They were worked by ZLs 1TWR, 3AIC, 3NE, 3TIB, 3TIC, 3TY and 4BTN. In addition, eleven VK2s and two VK1s were worked by ZL3TY on 20/1 but no further details. The ZLs are as elusive as ever into VK5!

Ross Hull Contest

Looking over advance information sent to me by John Martin VK3KWA, I note the Contest was won by VK2FZ/4 with 14048 points, followed by VK2ZAB 1093I, VK3XRS 10495 and VK2DVZ 10345. Next was VK6KZ with 6943 and Wal was the only station to operate on 50, 144, 432, 1296, 2304, 3456 MHz and

10 GHz, scoring 1216 points on the latter band. Good work gentlemen. Full results will be in the May issue of *Amateur Radio*.

From G4UPS

Ted G4UPS sent an analysis of his 1995 QSOs. He writes: *I was very surprised to find that 50% of all six metre QSOs were made on CW. I did realise, however, that all the real DX contacts into W land were made on CW, as were nearly all the rare contacts such as 3V8BB, 4K6D, 4N5, FP5, etc.*

Total QSOs were 1883 during 1995 with 936 on CW. These figures represent 65 different countries, 265 grid squares and 22 fields. The busiest months were May with 240 contacts, June 486 and July 305.

I think this proves that, despite having only a few rungs of the current solar cycle ladder to go to reach the trough, I feel sure that a newcomer to the band would be extremely pleased to have notched up well over 50% of his or her DXCC for the six metre band. I have only a 4 element Yagi, because of my location, and I am sure that many others will also be most pleasantly surprised when they analyse their 1995 six metre logs.

Most certainly 1995 was a much better year on six metres than many would have believed, and certainly better than many predicted. Perhaps we can entice back to the band those who think that six metres is closed until the peak of the next cycle! January 1996 started well with 16 countries, 9A, DL, G, GW, I, OE, OH, OK, OM, ON, OZ, S5, SM, SP, YL and YU.

Closure

Part of February was very busy as attested by the above reports. It was frustrating that I could not be part of the contacts to Perth, but the signals simply travelled either side of me, at the same time largely bypassing Adelaide. This is shown by reference to the map. But, there is always next time!

Closing with two thoughts for the month:
1. Effective knowledge is that which includes knowledge of the limitations of one's knowledge, and
2. I do beseech you to direct your efforts more to preparing youth for the path and less to preparing the path for the youth .... Judge Ben Lindsey.

73 from The Voice from the Lake.
PO Box 169, Meningie SA 5264
Fax. (085) 751 043
Packet VK5LP@VK5WI#ADL.#SA.AUS.OC

Stolen Equipment

The following equipment has been reported stolen. If you have any information that may lead to the recovery of the equipment, please get in touch with the advised contact as soon as practicable.

Make:	ICOM
Model:	ICW2A
Serial Number:	05048
Type:	Handheld transceiver
Accessories:	Soft case and speaker/mic
Stolen from:	Tea Tree Gully, SA
Date:	13 January 1996
Owner:	Rob Janoska
Callsign:	VK5CS
Contact details:	PO Box 204, Birdwood, SA 5234; or via packet: VK5CS@VK5HB

Make:	ICOM
Model:	IC-725
Serial Number:	9511
Type:	HF Transceiver
Stolen from:	Greenacre, NSW
Date:	29 February 1996
Owner:	John Blunn
Callsign:	VK2TAT
Contact details:	(02) 707 9505

Make:	ICOM
Model:	IC-24AT
Serial Number:	5430
Type:	Dual Band Handheld
Accessories:	Speaker Mic
Stolen from:	Greenacre, NSW
Date:	29 February 1996
Owner:	John Blunn
Callsign:	VK2TAT
Contact details:	(02) 707 9505

Make:	GME
Serial Number:	PSA1225
Type:	35 Amp Power Supply
Stolen from:	Greenacre, NSW
Date:	29 February 1996
Owner:	John Blunn
Callsign:	VK2TAT
Contact details:	(02) 707 9505

Make:	MFJ
Model:	Deluxe Versa Tuna II 949E
Type:	HF Antenna Tuner
Stolen from:	Greenacre, NSW
Date:	29 February 1996
Owner:	John Blunn
Callsign:	VK2TAT
Contact details:	(02) 707 9505

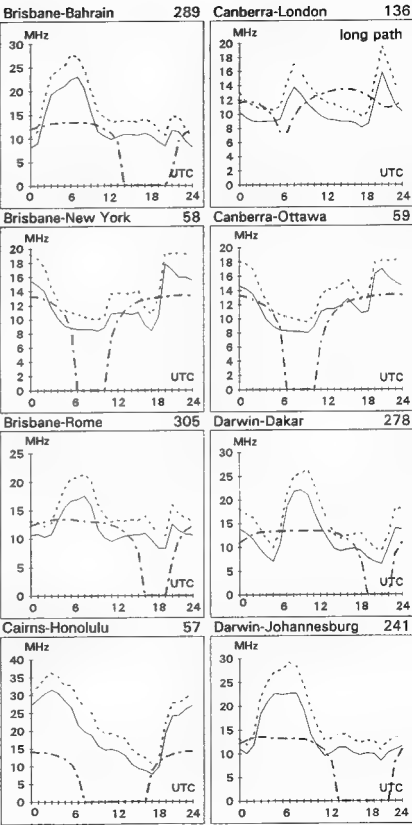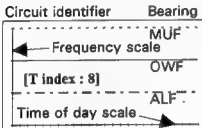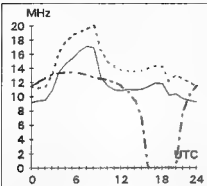| Make:	Mirage
Serial Number:	3660-1080
Type:	2 Metre Amplifier
Stolen from:	Greenacre, NSW
Date:	29 February 1996
Owner:	John Blunn
Callsign:	VK2TAT
Contact details:	(02) 707 9505

HF Predictions

Evan Jarman VK3ANI

These charts were prepared using one of the IPS stand-alone prediction systems. They show the diurnal variation in ionospheric conditions. The legend below indicates how each of the frequencies is plotted.

Those frequencies are:-

ALF Absorption limiting frequency
MUF Maximum useable frequency
OWF Optimum working frequency

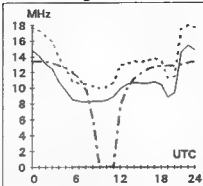The T index used is shown in the legend.

Also included is the path bearing for the Australian station of each circuit. The short path is displayed unless indicated.

ar

Circuit identifier · Bearing
MUF — Frequency scale
OWF
[T index : 8]
ALF
Time of day scale

Brisbane-Bahrain 289
Canberra-London 136 long path
Brisbane-New York 58
Canberra-Ottawa 59
Adelaide-Atlanta 79
Brisbane-Rome 305
Darwin-Dakar 278
Adelaide-Hong Kong 334
Cairns-Honolulu 57
Darwin-Johannesburg 241

Melbourne-Berlin 310 · Perth-Chicago 55 · Sydney-Rio de Janeiro 164
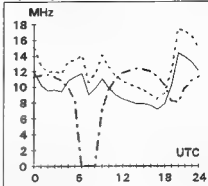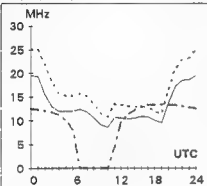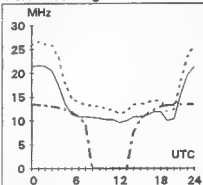
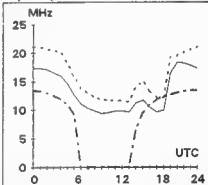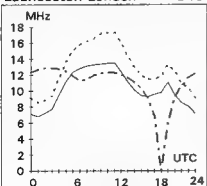Melbourne-Miami 94 · Perth-Glasgow 319 · Sydney-Seoul 340
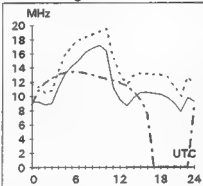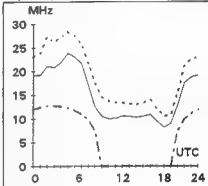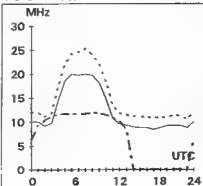
Melbourne-Rangoon 310 · Perth-Los Angeles 72 · Sydney-Vancouver 45
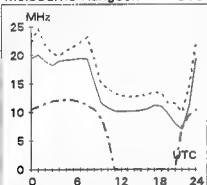
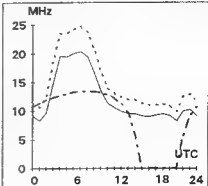Launceston-London 340 · Perth-Pretoria 249 · Hobart-Tel Aviv 282

Spotlight on SWLing

Robin L Harwood VK7RH*

April has come and propagation conditions are making their seasonal alterations. Most of the International stations now make their major frequency alterations on the last Sunday in March, to take account of the introduction of daylight saving in Europe. This means that programs primarily directed to European audiences are aired one hour earlier than previously. This usually continues until the last Sunday in September.

However, all the European Union countries will now be extending this to the last Sunday in October, which will, therefore, conform with North America reverting to Standard Time. The last Sunday in October also happens to be the time for some Australian states to change to Daylight Saving. So it appears to be a conscious trend by international broadcasters to cut down the number of frequency changes from four to two.

The future of Radio Canada International seems assured after a recent Cabinet reshuffle, which saw a new Communications Minister appointed in Ottawa. The protests seem to have had some impact and RCI will continue, but the extent of the programming has yet to be worked out. I also think several international broadcasters who use the Sackville site to rebroadcast their programming in North America, were concerned at the possible closure.

Yet another country has been lost to shortwave radio. For about 20 years, Deutsche Welle has been broadcasting from a site at Cyclops, Malta, using 250 kilowatt transmitters. These closed in January and shortwave broadcasting ceased. I believe that the senders have already been dismantled and the site is to be utilised for other purposes. The closure of the site also meant that a joint Maltese/Libyan shortwave station, "Radio Mediterranean", which was using these senders, closed down. It used to be on 9765 kHz at 0600z in English, followed by Arabic. "Radio Mediterranean" is looking for some other senders to broadcast from, but is

having some hassles because of the Libyan connection.

I have also heard strong rumours that the Carnarvon site of Radio Australia is going to close in June. The senders would be packed up to Darwin and Shepparton. The Carnarvon site is on the former NASA Space tracking station, which became famous during the early American manned space flights Placing the senders at Shepparton and Darwin makes economic and strategic sense, although Carnarvon is less susceptible to cyclones than Darwin.

Recently I managed to hear another nation broadcasting on shortwave. Radio Almmaaty in Kazakhstan is easily heard on 9560 kHz at 0630 UTC in English. It is located near Alma Ata, close to the Chinese border. The Kazakh Republic is the largest Central Asian republic, stretching across two time zones from the Caspian sea to the Chinese border. It has the Baikonur Cosmodrome, where the Russian Space launches are held. The Semipalatinsk region in the northwest of the republic is where the majority of Soviet nuclear explosions were conducted until the breakup of the USSR.

"Waveguide", the weekly ten minute program on the BBC World Service, went

---

WIA Divisions

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually in their residential State or Territory, and each Division looks after amateur radio affairs within its area.

Division Address	Officers			Weekly News Broadcasts	1996 Fees	
VK1 ACT Division GPO Box 600 Canberra ACT 2601	President Secretary Treasurer	Philip Rayner John Woolner Bernie Cooper	VK1PJ VK1ZAO VK1KXO	3.570 MHz LSB, 146 900 MHz FM each Wednesday evening commencing at 8.00 pm local time. The broadcast text is available on packet, on Internet aus.radio amateur.misc newsgroups, and on the VK1 Home Page http://email.dia gov.au/ cmskin/wisact.html	(F) (G)(I) (X)	$70.00 $56.00 $42.00
VK2 NSW Division 109 Wigram Street Parramatta Sydney (PO Box 1066 Parramatta 2124) Phone (02) 689 2417 Freecall 1800 817 644 Fax (02) 633 1525	President Secretary Treasurer	Michael Corbin Eric Fossey Eric Van De Weyer	VK2YC VK2EFY VK2KUR	From VK2WI 1.845, 3.595, 7 146*, 10.125, 24.950, 28.320, 29.120, 52.120, 52.525, 144.150, 147.000, 438.525, 1281.750 (*morning only) with relays to some of 14.160, 18.120, 21.170, 584.750 ATV sound. Many country regions relay on 2 m or 70 cm repeaters. Sunday 1000 and 1930. Highlights included in VK2AWX Newcastle news. Monday 1930 on 3.565 plus 10 m, 2m, 70 cm, 23 cm. The broadcast text is available on the Internet newsgroup aus.radio amateur.misc, and on packet radio.	(F) (G)(I) (X)	$86.75 $63.40 $36.75
				Web: http://sydney.dialix.oz.au/~wianswer e-mail address: wianswer@sydney.dialix.oz.au		
VK3 Victorian Division 40G Victory Boulevard Ashburton Vic 3147 Phone (03) 9885 9261 Fax (03) 9885 9298	President Secretary Treasurer	Jim Linton Barry Wilton Rob Halley	VK3PC VK3XV VK3NC	VK3BWI broadcasts on the 1st and 3rd Sunday of the month, starts (F) 10.30 am. Primary frequencies 1.840 AM, 3.615 LSB, 7.085 LSB, and FM(R) 146.700 Mt Dandenong, 147.250 Mt Macedon, 147.225 Mt Baw Baw, and 2 m FM VK3RMA, VK3RSH, VK3ROW, 70 cm FM(R)x VK3RCV and VK3RGL. Major news under call VK3WI on Victorian packet BBS	(F) (G)(I) (X)	$72.00 $58.00 $44.00
VK4 Queensland Division GPO Box 638 Brisbane QLD 4001 Phone (074) 95 4714	President Secretary Treasurer	Geoff Sanders John Stevens John Presotto	VK4IKEL VK4AFS VK4WX	1.825 MHz SSB, 3.605 MHz SSB, 7.118 MHz SSB, 14 342 MHz SSB, 28.400 MHz SSB, 29.220 MHz FM, 52.525 MHz FM, 146 700 MHz FM, 147.000 MHz FM, 438.525 MHz (Brisbane only), regional (X) VHF/UHF repeaters at 0900 hrs Sunday. Repeated on 3.605 MHz SSB & 147.000 MHz FM, regional VHF/UHF repeaters at 1930 hrs EAST Monday. Broadcast news in text form on packet under WAAQ#VKNET	(F) (G)(I) (X)	$72.00 $58.00 $44.00
VK5 South Australian Division 34 West Thebarton Road Thebarton SA 5031 GPO Box 1234 Adelaide SA 5001 Phone (08) 352 3426	President Secretary Treasurer	Garry Hentsen Maurie Hooper Charles McEachern	VK5ZK VK5EA VK5KDK	1827 kHz AM, 3.550 kHz LSB, 7.095 AM, 14.175 USB, 28.470 (F) USB, 53 100 FM, 147.000 FM Adelaide, 146.700 Mid North, (G)(I) 146.800 FM Mildura, 146.925 FM Barossa Valley 146 900 FM (X) 146.925 FM Central North, 147.825 FM Gawler, 438.425 FM Barossa Valley, 438.475 FM Adelaide North, ATV Ch 35 579.250 Adelaide. (NT) 3.555 USB, 7.085 USB, 10 125 USB, 146.700 FM, 0900 hrs Sunday	(F) (G)(I) (X)	$72.00 $58.00 $44.00
VK6 West Australian Division PO Box 10 West Perth WA 6872 Phone (09) 351 8873	President Secretary Treasurer	Cliff Bastin Mark Bastin Bruce Hedland-Thomas	VK6LZ VK6OO	146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 1.825, 3.560, (F) 7.075, 14.116, 14.175, 21.185, 29 860 FM, 50.150 and 438.525 MHz (G)(I) Country relays 3.582, 147 350(R) Busselton and 146 900(R) Mt (X) William (Bunbury). Broadcast repeated on 146.700 at 1900 hrs Sunday, relayed on 1.865, 3 563 and 438 525 MHz; country relays on 145.350 and 146 900 MHz	(F) (G)(I) (X)	$80.75 $48.80 $33.75
VK7 Tasmanian Division 52 Connaught Crescent West Launceston TAS 7250 Phone (003) 31 9606	President Secretary Treasurer	Andrew Dixon Robin Harwood Terry Ives	VK7GL VK7RH VK7ZTI	146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on (F) 147 000 (VK7RNA), 146 725 (VK7RNE), 146.825 (VK7RMD), (G)(I) 3.570, 7.090, 14.130, 52.100, 144.150 (Hobart) Repeated (X)	(F) (G)(I) (X)	$72.00 $58.00 $44.00
VK8 (Northern Territory is part of the VK5 Division and relays broadcasts from VK5 as shown recorded on 14 or 28 MHz).						

Membership Grades
Full (F)   Pension (G)
Needy (I)   Student (X)
Non receipt of AR (X)

Three-year membership available to (F) (G) (X) grades at fee x 3 times.

Note: All times are local. All frequencies MHz.

Continued from page 55

into recess at the end of last month and could be re-activated in October. There are question marks whether it will be re-activated, judging by comments on the Usenet "rec.radio.shortwave" forum on Internet. This program was a successor to the "World Radio Club" and helped BBC World Service listeners to understand shortwave. It is hoped that it will continue after its hiatus and not go the way of "Swiss Merry-Go Round".

Well, that is all for April. Until next time, the very best of monitoring and 73.

*52 Connaught Crescent, West Launceston TAS 7250
VK7RH@VK7BBS.LTN TAS.AUSOC
Internet robror@tamarcom.com.au
fidonet 3:670/301*

ICOM

Count on us!

You can always teach an old dog new tricks.

Icom innovation continues! We're keeping pace with all the latest trends in communication. Even a crafty old dog like Icom's
Duncan Baxter, VK 3LZ, is impressed. Three of our new radios - the IC-281H(2m), IC-481H(70cm) and IC-820H (dual band)
have facilities for packet operation at 9600bps plus each model is loaded with today's other wanted features.
And the IC-820H is especially designed for satellite operation.
Call Duncan and the Icom team for a brochure or the name of your nearest dealer

Icom Australia 7 Duke Street Windsor Victoria 3181
Free Call : (008) 338 915   Ph : (03) 529 7582 Fax : (03) 529 8485 A.C.N. 006 092 575

IC-291H   IC-820H

Exposure Draft

Submission
to the
38th Parliament
on
Amateur Radio Service Licensing

Towards a New Licensing System

February 1996

from the
Wireless Institute of Australia

PREAMBLE
This "Exposure Draft" is *not the final* submission. That will come later and is planned to include further argument and considerably more detail evidencing the value of amateur radio to the community. The purpose of publishing this draft is to stimulate further discussion within the amateur radio fraternity, and provide time for the Institute to advocate the objectives of the proposals and the refine the details and supporting material in response to feedback.

In the final event, the WIA will be dealing with the 38th Parliament on this issue, negotiating for the benefit of all Australian radio amateurs. In order to successfully pass through the committee systems of the Lower House and the Senate, we need to gain the interest and support, not only of the Government, but the Opposition and minority party members of Parliament.

Foreword

The Amateur Radio Service is a voluntary, non-commercial service made up of people with an interest in radio communications. Radio amateurs are individually licensed by the Spectrum Management Agency, under the Radiocommunications Act 1992.

Each radio amateur pays a licence fee determined by the Spectrum Management Agency. In late-1994, the SMA proposed to raise the fee more than 190%, from $36 at that time to $69, for the Unrestricted licence.

The Australian amateur radio fraternity raised a storm of protest with their Parliamentarians during early 1995, resulting in the Government announcing a new fee of $51 in March 1995.

The Wireless Institute of Australia was invited to put a submission proposing how the Australian Amateur Radio Service could be better licensed.

This *Exposure Draft* is the "first working" of that submission. It is being circulated to all candidates of the Government and Opposition parties standing for this 1996 election, together with candidates from other major parties. It is also being widely distributed among the amateur radio community in Australia. Once this Exposure Draft has been circulated and feedback received, a final submission will be drafted for consideration by the 38th Parliament.

This document has been researched and compiled by our organisation's Media Liaison Officer, Roger Harrison, call sign VK2ZRH, a communications engineer by training and a journalist by profession, and is the culmination of nearly 12 months of research and discussion within the Wireless Institute of Australia and the amateur radio community, with input being received from many radio amateurs around Australia.

On behalf of the Wireless Institute of Australia, I commend you read and digest the information and arguments presented for a better amateur radio licensing system, distilled from the thoughts and ideas of the radio amateurs of Australia.

Neil Penfold VK6NE
Federal President, Wireless Institute of Australia
25 February 1996

1.0 Radio Amateurs Protest Fees Rise

Radio amateurs are licensed by the Spectrum Management Agency (SMA) after passing a publicly conducted examination on electrical, electronics and radiocommunications theory and practice, and radiocommunications regulations, and for some licence grades, a practical test in sending and receiving

Morse code. Upon receiving a pass mark of 70% or more in theory and regulations, and demonstrating the required competency in Morse code (where required), candidates apply to the SMA for an Amateur Operators Certificate of Proficiency and a licence. The SMA issues an **Apparatus Licence**, with the 'type' designated **Amateur**, and a call sign which is unique to the individual. This licence provides the holder with access to all allocated amateur radio bands designated in the relevant Technical Licence Specifications (TLS) issued by the SMA.

The Amateur licence is for people interested in any and every aspect of radio communications. It allows them to conduct experiments and all manner of other activities, and to learn for themselves about communications technology, using bands of frequencies spread throughout the radiofrequency spectrum.

There are some 18,000 licensed radio amateurs in Australia. This community of radio amateurs has a representative association called the **Wireless Institute of Australia**, (WIA) founded in 1910. It is the amateur radio community's "peak body" and actively represents radio amateurs' interests to the SMA, on Standards Australia's committees, the Radiocommunications Consultative Council, the International Radiocommunications Advisory Council, and other community bodies.

In 1994, the Amateur licence fee under the then existing Apparatus Licence fees schedule was $36.

In December 1993, the SMA commenced a public inquiry into the Apparatus Licence system, a system which had evolved over many decades. The SMA published a Discussion Paper, titled *Inquiry into the Apparatus Licence System*. This paper set out a proposed new framework of the Apparatus Licence system and a new method of determining licence fees. The SMA said:

> Apparatus licence fees provide a means of obtaining a monetary return from the private use of a community resource.
>
> The SMA is proposing a licence fee structure which does not depend upon licence categories but is in accordance with government policies. It involves:
> - charging for SMA services
> - imposing a licence fee that has two components:
>   - a charge to recover ongoing SMA spectrum management costs, and
>   - a tax for access to a valuable community resource.

In December 1994, at a meeting between the SMA and the WIA, the SMA set out a proposed schedule of fees under the new Apparatus Licence fees schedule that was to be introduced in March 1995. The proposed fee for the majority of amateurs, holding an Unrestricted licence, was set at $69. This was made up of three components:

1/ $25 *Administrative Charge* to issue a licence/call sign, and to renew;

2/ $9 *Spectrum Maintenance* fee;

3/ $35 *Spectrum Access Tax*.

The SMA's new licence pricing policy was released to the amateur radio community, via the amateur radio digital packet radio network and WIA amateur band broadcasts in mid-December 1994. A circular explaining it was inserted in the WIA's journal *Amateur Radio* magazine for January 1996.

Opposition to the proposed fee structure began to be expressed among radio amateurs immediately. After monitoring radio amateurs' initial reactions, the WIA issued a press

release at the end of December 1994, to bring the issue to the attention of as many radio amateurs as possible, and to the Australian community *The Age* newspaper ran a story on Tuesday, 3 January 1995. "Ham radio users attack fees." The national television networks carried news stories about the issue on the evening news programs the same day. Many metropolitan and regional newspapers subsequently ran stories on the issue

In January 1995, the then Amateur licence fee rose from $36 to $37, and the proposed new licence fee to apply from March 1995, rose to $71.

Following suggestions arising from WIA members, the WIA encouraged radio amateurs to write to parliamentarians, expressing their opposition to the fee. Many, many amateurs from around Australia contacted their members of Parliament. The WIA also wrote to parliamentarians. Subsequently, the Amateur licence fees issue was debated in Federal Parliament in February, 1995.

The WIA had contact with the office of the Minister for Communications and the Arts, Michael Lee, in February 1995, with a view to negotiating on the issue. Subsequently, an appointment was made for WIA representatives Roger Harrison (Vice President, and Media Liaison Officer, call sign VK2ZRH) and David Wardlaw (ITU Conference and Study Group Coordinator, call sign VK3ADW) to meet the Minister's Parliamentary Secretary, Paul Elliott, on 6 March 1995. Amongst the information the WIA put to Paul Elliott was:

- the many ways the Amateur Radio Service was of value to the community, particularly the self-training aspect,
- the lack of information from the SMA until December 1994 on how Amateur licence fees would be affected by the price-based spectrum allocation system,
- the range of views expressed by the amateur radio fraternity since the December 1994 announcement of the proposed fee structure,
- how WIA representatives had provided expert assistance on non-amateur matters on behalf of the Australian Government's delegations at international radio conferences (at WIA members' expense),
- the issue of amateur radio access to the spectrum,
- and the WIA's objections that the Amateur Radio Service was unsuited to being included under the Apparatus Licence System, dating from the 1990-91 House of Representatives Standing Committee on Transport and Communications Infrastructure (HORSCOTCI) hearings on spectrum management

On March 8, Paul Elliott announced to the Parliament that the proposed Amateur licence fee of $71 would instead be $51. In a press release dated 9 March 1995, Paul Elliott said:

"After further consultation and in recognition of the valuable services provided by Amateurs to the community in maintaining communications links, and in training young people to be proficient in communications technology, the SMA has decided to reduce the tax component of Amateur fees to the minimum level

The new fee is based on the administration and maintenance services provided to Amateurs by the SMA, including the costs of issuing the licences, managing interference; issuing and registering call signs arranging and accrediting examinations, and international coordination."

In the 6 March meeting between Paul Elliott and the WIA representatives, Paul Elliott asked the WIA to put a submission to the Government on how the Amateur Radio Service might be better licensed. This submission has been developed as a result of that invitation.

2.0 About Amateur Radio

Definition

Radio amateurs appeared with the advent of wireless technology in the late 19th century. With the proving of the usefulness of the technology came government regulation in developed nations of the time, and eventually international agreements on the regulation of the radiofrequency spectrum.

Out of the parallel burgeoning of telegraph and telephone technology and the development of international communications by these means, came the establishment of the International Telecommunications Union (ITU) which determines international regulatory issues by means of international treaty agreements.

The international Radio Regulations, developed at international conferences held under the auspices of the ITU, define the Amateur Service as follows:

"A *radiocommunication service* for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest."

[ITU Radio Regulations, S1.56]

With the advent of earth satellites in the late 1950s, it was but a few short years before a satellite designed and constructed by radio amateurs orbited the earth, launched in December 1961 and dubbed OSCAR, for Orbital Satellite Carrying Amateur Radio. Almost 40 amateur radio satellites have been launched in the intervening 30 years. This development in amateur radio was later recognised by the ITU and a definition for the **Amateur-Satellite Service** was subsequently incorporated in the international Radio Regulations.

"A *radiocommunication service* using *space stations* on earth *satellites* for the same purpose as those of the *amateur service.*"

[ITU Radio Regulations, S1.57]

For the purposes of licensing Australian radio amateurs, the Spectrum Management Agency (SMA) defines the Amateur licence type as:

"A station that
- is operated for the purposes of self training in, intercommunication and technical investigation into, radiocommunications by individuals who
  - do so solely with a personal aim, and
  - do not have a pecuniary interest in doing so, and
- is operated on amateur frequencies or frequency bands specified in the licence or in a technical licence specification referred to in the licence, and
- may participate in the Amateur Satellite Service "

[*Inquiry into the Apparatus Licence System - A New Outlook,* SMA, February 1995]

Radio amateurs pursue their interests in the true meaning of the Latin root of the word *amateur*, that is, for the *love* of it.

Radio Amateurs' Activities

There are three "foundation stones" to radio amateurs' activities, which are enshrined in the ITU definition of the Amateur

Service: *self-training, intercommunication* and *technical investigations.*

SELF-TRAINING. In order to obtain the Amateur Operators Certificate of Proficiency and gain a licence, prospective radio amateurs must sit for a publicly conducted examination, comprising modules of theory, regulations and/or Morse code operation, depending on the licence sub-type desired. The system is illustrated in *Appendix LS1, The Amateur Licensing System.*

The Australian amateur licensing system provides for seven licence sub-types, so there are multiple "entry points" to the licensing system to accommodate candidates' interests and level of knowledge.

The licence sub-types are as follows:

Unrestricted	Intermediate	Limited
Novice	Novice Limited	
Amateur Beacon	Amateur Repeater	

The last two sub-types are unattended stations operated by licensed individuals or special interest groups for the benefit of other radio amateurs. These licenses are not obtained by examination.

Candidates for the first five licence sub-types all sit for multiple choice theory and regulations papers, while candidates for the Unrestricted, Intermediate and Novice licences sit for additional practical sending and receiving tests in Morse code. The pass mark in the theory and regulations papers is 70%.

The syllabuses for these examinations is published by the SMA (*Information for Prospective Amateur Operators*, RIB70 Revised, August 1994). The syllabuses cover basic electrical and electronics theory and technology, radiocommunications principles and technology, interference and safety. A level of knowledge is required such that licensees can assemble and operate their stations with sufficient competence such that they can carry on their pursuits and technical experiments or investigations without being a danger to themselves or others, and without causing harmful interference to other spectrum users

Right from the outset, even before a licence can be obtained, amateur radio necessarily involves self-training.

Having obtained a licence, radio amateurs will *learn for themselves*, in a practical way, about the techniques and technologies involved in radiocommunications. They have the comparative freedom and the flexibility to pursue an enormous range of radiocommunication techniques and technologies, ranging from: medium frequency transmission, propagation and reception, through high frequency (short-wave) transmission, propagation and reception, earth satellite communications techniques and digital communications techniques, television transmission and reception to microwave technologies and communications techniques, to name but a few among the vast scope of pursuits available.

People who have an interest in technology and gain an understanding of it through self-training are better equipped to adapt to and benefit from an increasingly technological world which is undergoing continuous and rapid change. This is particular so for young people. The Australian amateur radio community particularly encourages young people's interest in radiocommunications technology.

INTERCOMMUNICATION. The purpose of assembling and operating a radiocommunication station is to make contact with other people having a like interest. Radio amateurs use their radio frequency band allocations, which are spread throughout the spectrum from the medium frequencies (MF) through to the microwave extra high frequencies (EHF), to communicate with one another.

The intercommunication may be by means of the international Morse code, which operates as a "universal language" irrespective of the amateurs' country of origin, culture or language, by voice communication, by the exchange of digital text-data transmissions, or by the exchange of images.

The content of the intercommunication may be related to technical issues or it may be personal exchanges between the operators, similar in nature to having a conversation face-to-face with another person. That is, it is normal human interaction. When radio amateurs become involved in providing communications assistance during emergencies, the intercommunication comprises important messages related to the emergency event.

It is through all the varieties of intercommunication between amateur radio operators that radio amateurs learn the pertinent procedures necessary to establish radiocommunication contact in all the spheres available to them

On the international scale, intercommunication between radio amateurs helps to break down not only barriers of distance, but barriers of understanding about culture and life among other communities around the world. Radio amateurs belong to an international fraternity bound together by their mutual interest in amateur radio activities.

Radio amateurs come from all walks of life, are found among the ordinary citizens of large cities and rural communities, in prominent businesses and scientific institutions, in schools and universities, in government authorities, in politics and among the world's royalty.

TECHNICAL INVESTIGATIONS. As outlined above, radio amateurs have the freedom and the flexibility to pursue an enormous range of radiocommunication techniques and technologies within the bounds of the regulations attached to the Radiocommunications Act and the Technical Licence Specifications issued by the SMA. This freedom to conduct technical investigations is fundamental to many of the contributions Australian radio amateurs have made to the Australian community and indeed, to the Australian economy.

In order to pursue technical investigations and self-training in as many spheres of radiocommunications as possible, the Amateur Service has access to small bands of frequencies spread throughout the radiofrequency spectrum, ranging from the medium frequencies (MF), through the high frequency (HF, or "shortwave") range, right through to the upper microwave extra high frequencies (EHF). A proportion are exclusive to the Amateur Radio Service, but radio amateurs share a considerable amount of spectrum on bands allocated to primary users from other services (e.g. defence, industrial equipment and broadcasting). On bands where radio amateurs are secondary users, they must avoid interference to and accept the possibility of interference from, the primary users. The availability of such a wide variety of frequency bands throughout the radiofrequency spectrum provides and encourages the flexibility and freedom for radio amateurs to undertake technical investigations of an enormous variety, unfettered by limitations on access to spectrum.

Radio amateurs have gained this access to spectrum through representations at many World Administrative Radio Conferences over the years, effectively recognising the intrinsic value of the Amateur Radio Service to the world community.

When someone is able to conduct a practical technical investigation for themselves, they gain a better understanding and a deeper knowledge of the subject than by any other means. When that is driven by a strong personal interest, as it is with amateur radio activities, then that understanding is immeasurably strengthened. This principle applies regardless of the technical level of the participant and the investigation.

Knowledge and understanding gained in this way can never be trivialised. Such people become an important community asset.

When it motivates young people to take up a tertiary course in engineering or science, and/or to enter a career in electronics or telecommunications technologies, then the nation is the richer for it.

The Wireless Institute of Australia

As outlined earlier, the amateur radio community in Australia has a representative association called the Wireless Institute of Australia (WIA), founded in 1910. It is acknowledged as being the first amateur radio society in the world.

The WIA is a federation of seven state and territory Divisions, each of which is an autonomous body. They are known as: WIA A.C.T. Division, WIA NSW Division, WIA Victorian Division, etc. The WIA is the Australian amateur radio community's peak body, and participates in a range of relevant community affairs, actively representing radio amateurs' interests to the SMA, on Standards Australia's committees, the Radiocommunications Consultative Council, the International Radiocommunications Advisory Council, and other community bodies.

The WIA is a member of the Region 3 Association of the International Amateur Radio Union (IARU), a representative body recognised by the ITU. The IARU is an active participant in ITU radiocommunications affairs.

The WIA has participated in the Australian Preparatory Groups for the ITU-organised World Administrative Radio Conferences, held at intervals over the decades up to 1992. The WIA has also provided members for the Australian delegations to these conferences. Now that World Radio Conferences are held at two-year intervals, the WIA is continuously involved, with a representative, Dr David Wardlaw (call sign VK3ADW), participating in the relevant groups. Dr Wardlaw was a member of the Australian delegation to the World Radio Conference, WRC-95, held in Geneva during October-November last year.

Over the years, the WIA has had regular liaison with the regulatory authorities, including the Post Master General's department (PMG), the Post & Telecommunications department (P&T), the Department of Transport and Communications (DoTAC) and now Australia's regulator, the Spectrum Management Agency (SMA).

The WIA has taken an active interest in the processes which led to reform of the Radiocommunications Act 1983, leading to the introduction of the new Act in 1992. When the House of Representatives Standing Committee on Transport, Communications and Infrastructure (HORSCOTCI) held its *Inquiry into Management of the Radio Frequency Spectrum* in 1990, the WIA made a submission to the committee in September that year. In 1991, when HORSCOTCI issued its *Discussion Paper on Issues and Options in Radio Frequency Spectrum Management*, the WIA again made a submission to the committee, in July that year.

Following the establishment of the SMA in 1993, they held a public *Inquiry Into the Apparatus Licence System*, from December 1993 through February 1995. The WIA, some WIA Divisions, and many individual radio amateurs made submissions to this SMA inquiry. Similarly, when the SMA issued its February 1995 Discussion Paper, *Implementing Spectrum Licensing*, the WIA, some WIA Divisions, many individual radio amateurs and amateur radio interest groups made submissions.

An off-shoot affiliate of the WIA is the Wireless Institute Civil Emergency Network (WICEN), with operating organisations in each state and territory of Australia. WICEN serves to prepare radio amateurs for service to the community

in an emergency. Radio amateurs use their own equipment and expertise, without reward, to provide the authorities with an invaluable communications resource that is not otherwise immediately available in a community emergency

With the ability to use a wide range of frequency bands across the radiofrequency spectrum and portable equipment suited to this type of operation, the flexibility afforded is not usually available to other services when communications problems occur. The WICEN organisations around Australia have formal links with the various emergency services and authorities.

The Senate Standing Committee on Industry, Science, Technology, Transport, Communications and Infrastructure, has recognised the importance of volunteer assistance during emergencies:

> "Volunteer organisations provide a focus for community-minded individuals, ensuring that a large amount of work is carried out in an effective way, and a wide range of voluntary organisations become involved in emergency situations. Some specialise in response and immediate first aid, such as St John Ambulance Australia and the Red Cross . . . and others specialise in the provision of emergency communications, such as . . . WICEN "
>
> [*Disaster Management*, published by the Senate Standing Committee on Industry, Science, Technology, Transport, Communications and Infrastructure, June 1994]

Additionally, the Senate Committee gave particular recognition to WICEN:

> "WICEN is a volunteer group of radio amateurs with communications and information transfer skills and equipment. The organisation can be called upon by response and recovery agencies and the general community in times of emergency. WICEN's major role is the coordination of the response of the general amateur radio service in times of need.

Inspector Mackey of the Victoria Police acknowledged that WICEN performs a major role in the provision of back-up communication in the event of disasters in that state:

> WICEN is our main back-up for communications within this State If we are to lose telecommunications, our normal radio frequences become overloaded. WICEN basically becomes our one and only back-up frequency until we perhaps get assistance from Defence, but still they would stay as our number one back-up."
>
> [*Disaster Management*, published by the Senate Standing Committee on Industry, Science, Technology, Transport, Communications and Infrastructure, June 1994]

The Senate Committee went on to recommend that WICEN be included in the National Communications Advisory Group in reviewing emergency communications throughout Australia.

> "The Committee recommends that the National Emergency Management Committee request the National Communications Advisory Group to review emergency communications throughout Australia with a view to finding ways of achieving standardisation and compatibility among and between state emergency services. The Committee further recommends that a representative of WICEN be included in the Group."
>
> [*Disaster Management*, published by the Senate Standing Committee on Industry, Science, Technology, Transport, Communications and Infrastructure, June 1994]

The WIA, as the peak body of the amateur radio fraternity in Australia, is an active participant in, and contributor to, community affairs which affect radio amateurs and where the Amateur Radio Service can be of value to the community.

3.0 The Value of the Amateur Radio Service to the Community

"The Amateur Service world-wide, uses or experiments with, virtually every aspect of the art of radio communication, from the very simple to the most sophisticated

It is the urge of the amateur to experiment and to communicate that is expressed in many countries in different ways. The self-education of individuals or the establishment of classes to be attended by those who wish to qualify as radio amateurs provides a basic education for many who would not otherwise acquire that knowledge

Whether it is the construction of a simple telegraphy transmitter for the novice, or a satellite earth station for the advanced amateur, both are learning. The amateur is restricted by regulation in the matters that may be the subject of his communication. His common interest with all other amateurs in the world is his interest in the radio art, and by that intercommunication knowledge is exchanged and expanded

The knowledge and the experience of communications, and the existence of the equipment that the amateur uses, provide a valuable resource that in many countries cannot be found in any other service.

The most important features of the Amateur Service are:

(1) it makes unique provision for advancing an individual's skills in both the technical and operating phases of the art, thus helping to provide a reservoir of trained operators, technicians and electronics experts. It also provides an avenue for further investigation for those already involved in this field;

(2) it has a unique ability to enhance international goodwill;

(3) it is a voluntary, non-commercial service.

The interests of radio amateurs are as diverse as the number of countries and regions in which they are located.

The basic desire to study radio communications techniques with the opportunity for practical applications leads to

(1) the acquisition of experience and skill in communications techniques and operating;

(2) contact and interchange of information with others having similar interests;

(3) furtherance of the unique ability of the radio amateur to promote international goodwill;

(4) contribution to scientific research by participation in programs organised on a national or international basis, and

(5) participation in communications systems including emergency communications by both training and assistance when required.

Reference has been made to the urge to conquer the ether and communicate. The Amateur Service provides a trained, regulated and disciplined outlet for that desire. Otherwise that urge, and the desire to experiment with communications might find its outlet in undisciplined, illegal and perhaps potentially dangerous transmissions.

An important aspect of the Amateur Service is that, because the amateur must be qualified and been licensed by his administration, he is known and recognised. The amateur zealously guards his spectrum allocations and rejects the improper use of the frequencies allocated for his use. Such improper use cannot go unnoticed, nor can unauthorised users hope to remain undetected. It would be a foolish act to operate a clandestine transmitter in an amateur service allocation.

Many administrations rely heavily on the fact that the Amateur Service is a safeguard against unauthorised use of radio communications."

The above text is the preamble from a paper entitled *The Amateur and Amateur Satellite Service - A Microcosm of Radio Communications*, presented at the Australian "Communications '92 Conference", by Dr David Wardlaw (call sign VK3ADW). It is an effective, succinct summary of the

Amateur Radio Service's reason-for-being, its place within, and broad impact on the community.

Apart from the broad aspects introduced above, there are a number of specific areas where the Amateur Radio Service is of demonstrable value to the community, many of which could be said to *return* value to the community. Under the following headings are presented summaries and pertinent examples of this thesis. It is by no means exhaustive, because the information is voluminous indeed. But the information presented, while showing "the tip of the iceberg", should demonstrate the breadth, depth and variety of ways in which the Amateur Radio Service is of value to the community.

Education and Self-training

Apart from the WIA state and territory Division organisations, there are some 150 local community amateur radio clubs and groups around Australia. Membership in these radio clubs ranges from 10-20, up to more than 400-500. Some 100 of these clubs conduct amateur licence classes for prospective radio amateurs.

The Wireless Institute of Australia (WIA), has conducted a nationwide amateur examination service on behalf of the Spectrum Management Agency (SMA), operating under a Memorandum of Agreement, since 1992 when the SMA devolved the examination routine to the WIA. This service is formally known as the **WIA Exam Service**. Invigilators accredited by the WIA Exam Service supervise candidates sitting for amateur licence examinations. The WIA Exam Service provides examination papers and Morse code materials for invigilators. The WIA has drafted examination syllabuses and questions banks and negotiated approval with the SMA. So, all the routine aspects of administering the amateur exam system are conducted by the WIA. There are some 500 accredited invigilators.

During 1995, a total of 450 examination events were held around Australia. Each year, between 300 and 400 new radio amateurs are licensed.

A number of Australian <u>radio amateurs who are school teachers</u> by profession have <u>incorporated amateur radio activities as part of their school's curriculum</u>, with beneficial results.

"In any class there are students who do not cope well outside their own small group of friends. There are the type of boys who do not like team sports and who often lack confidence, although they have the capacity, they are low achievers in school.

It has been clearly shown through a number of school programs that when this kind of child participates in the hobby of amateur radio he/she gains confidence and personal esteem. This translates into higher achievement with other school work.

The sense of achievement in contacting and talking to someone in a foreign country can be a catalyst for a turnaround in their classroom performance

This practical kind of experience often motivates children who can easily be turned off the study of physics and electronics by a dry textbook approach. For instance, the basics of electricity and magnetism can be picked up more quickly and with enthusiasm

Studying for an passing the exams to qualify for their own amateur licence has at times resulted in students progressing with their school work beyond their teacher's expectations."

[*Amateur Radio Benefits School Children*, Jim Linton VK3PC, Electronics Today International, Oct. 1989]

- a list of eight school teacher/radio amateurs which involved amateur radio in their schools, and were willing to provide teachers' assistance, was included at the end of this article, one from each state and the A.C.T (two from Victoria)

Victorian school teacher and radio amateur, **Maggie Iaquinto** (call sign **VK3CFI**), regularly uses amateur radio to demonstrate space science to her physics students.

> "Science students at three Victorian schools were over the moon last week after interviewing crew members on board the orbiting Russian MIR space station.
>
> "The students were astounded by being able to chat with space travelling scientists," said their schoolteacher and amateur radio enthusiast, Maggie Iaquinto, who organised the hook ups.
>
> The Year 12 students put a series of physics questions to Flight Commander Anatolij Solovyov, 43, and Flight Engineer Sergej Avdeev, 35, on board the space station.
>
> Mrs Iaquinto said the value of the hook-up in education and personal terms was enormous.
>
> "It gives them the rare opportunity not only to do research, gather data and analyse it, but also to obtain it direct from a primary source," she said.
>
> [Students over the moon after chat to spacemen, The Australian, 31 August 1992]

Similarly, more than 10 schools across Australia have had contact with the US Space Shuttle during the last five years, arranged and conducted via amateur radio. Some 2000-3000 students have been involved nationwide.

Some 100 secondary schools have used satellite telemetry provided by radio amateurs in the study of physics and related subjects at school. **Radio amateurs** who assisted include: Graham Ratcliff, call sign VK5AGR, Peter Ormerod VK3CPO, Joe Ellis VK4AGL, Maggie Iaquinto VK3CFI, Barry Abley VK3YBX, John Mahoney VK4JON, and Ball Magnusson VK3JT.

Western Australian radio amateur and teacher of electronics, **Ralph Bradstreet**, call sign **VK6KRB**, was appointed a **Member of the Order of Australia** for his contribution to the community, which stemmed from his amateur radio activities.

> "Lt Col Ralph Bradstreet AM RFD became interested in amateur radio during his teenage years and joined the CMF and became a radio operator. After completing a commissioning course he was appointed as an officer in The Royal Australian Signal Corps.
>
> His knowledge of radio matters enabled him to make considerable contribution to both the Signal Corps and the Army.
>
> As a Major he commanded two reserve units and was appointed a Member of the Order of Australia in 1988 and invested by Her Majesty The Queen
>
> Lt Col Bradstreet has trained hundreds of young men and women soldiers in radio communication skills over the past thirty years. In his civilian career he teaches electronics.
>
> An interest in Amateur Radio not only influenced Lt Col Bradstreet's career but as an active amateur radio operator it continues to provide skills which enhance his military and civil occupations."

Perth radio amateurs have provided training and assistance to the Paraplegic and Quadriplegic Centre at Shenton Park, Western Australia. **John Morgan**, call sign **VK6NT**, conducted an amateur radio training course for the Para-Quad residents in 1995. One of the residents to successfully gain his licence was 'Shane', who now proudly uses the call sign VK6HAM, signifying he has obtained one of the new Novice Limited licences, introduced in 1995 and designed to encourage young people into amateur radio.

The Centre has an active amateur radio club, call sign **VK6QC**, established with the **assistance of** Diane Cousins VK6BC, Glenn Cousins VK6AUZ, Ray Spargo VK6RR, Bob Philips VK6THB and Rob Lamb VK6VP.

In the early 1960s, a scheme to involve young people in amateur radio was advocated by a NSW radio amateur and school teacher, **Rex Black VK2YA**. The **Youth Radio Scheme** (YRS) was adopted as WIA policy in 1962. An entirely volunteer-run scheme, it trained thousands of young people in the following decade and was a major force behind the introduction of the Novice Amateur licence in the mid-1970s.

> "Founded by Rex Black VK2YA, it aimed to encourage young people to become radio amateurs by providing practical instruction in radio and electronics at clubs attached to schools and youth groups; some of these had been operating in the 1930s, but the YRS triggered a renewed interest. By 1967, 48 clubs and groups were operating in NSW alone, and the Scheme had spread to all states.
>
> "The YRS was based on a series of syllabuses, examinations and constructional projects. Those who satisfied the requirements were awarded certificates, several grades of which were available. The standards of the YRS were high. The level demanded of those who achieved the Advanced YRS certificate was more rigorous than the standard of current AOCP theory examinations. The first two levels of certification are still in use by schools today in some states."
>
> [Novice Notes, Peter Parker VK1PK, Amateur Radio, journal of the WIA, February 1996]

When community amateur radio clubs and groups burgeoned rapidly during the early 1970s, these clubs began to gradually take on the role established by the YRS. The core of the Youth Radio Scheme depended on the syllabuses and published teaching and self-study materials. Over the late 1970s a group of volunteer radio amateurs and teachers produced a coordinated set of publications for self-study at low cost. This work was carried out by Rex Black, Ken Hargreaves, Ian Hook, Derek Lark, Geoff Pages, Br Cyril Quinlan, Athol Titley, Tom Scott, Kurt Welzel and Dave Wilson, among others, all radio amateurs.

The publications produced at that time are now produced and distributed by the WIA NSW Education Service, and are regularly updated. It is run by two radio amateur volunteers, **Ian Hook and Kurt Welzel.**

> "The Service has been responsible for the education of a whole generation of radio amateurs. The material produced was popular, not only amongst aspiring amateurs. It has found ready acceptance amongst high schools, Scouts, the Armed Services, technical colleges, PMG/Telecom as well as private training colleges. Electronics became an accredited examinable subject in NSW high schools due to the influence of the WIA Education Service. The Service ran some 20 holiday camps for students with an interest in electronics. These were very popular, with 40-50 children normally attending."
>
> [Novice Notes, Peter Parker VK1PK, Amateur Radio, journal of the WIA, February 1996]

From the early 1980s, the **Gladesville Amateur Radio Club** in Sydney has provided video tape self-study courses, comprising a series of structured lectures presented in an entertaining and absorbing way. They supply them by mail order and many hundreds of radio amateurs have gained their licence through this service. This club has a well-equipped television studio and provides regular three-weekly transmissions of lectures and other material.

The way in which amateur radio clubs have taken on the education and self-training role is exemplified by the Westlakes Amateur Radio Club, located at Teralba near Newcastle in NSW. The club owns a spacious, well-equipped building with a class room and technical library. It conducts regular amateur radio licence classes and opens on weekday evenings and weekends to welcome enthusiasts, and they particularly encourage young people. Westlakes ARC has one of the largest club memberships in Australia.

Motivating Young People to Take Up Scientific or Technological Careers

An interest in amateur radio has served as a catalyst and motivation for thousands of young people over the years to enter scientific or technological careers. It is these careers which go towards making Australia a "clever country", acknowledged widely by academic, business, community and political leaders as an essential component for Australia's future growth and prosperity.

> "Our future will, to some extent, be dependent on our ability to not only generate and master new ideas, but also to turn these ideas into national wealth.
>
> In other words, our future will be dependent upon our ability to innovate - to combine the notion of newness with the notion of creating commercial value.
>
> To sustain economic growth, rising living standards and continual jobs growth we will need to ensure that Australia is technologically literate and information rich.
>
> We need to ensure that Australians are employed in interesting, well paid jobs that add value to our economy.
>
> I understand that Electronics has now passed Automotive as the world's largest sector.
>
> And by the 2000, electronic components will make up 25 per cent of all manufactured products.
>
> Looking specifically at the telecommunications industry, local equipment suppliers compete for over $3 billion worth of sales.
>
> Telecommunications exports are now over $1 billion per annum and growing . . . activity in the telecommunications industry indicates that sales are expected to rise by over 26 per cent, new investment in capital in the industry will rise by 22 per cent, employment by just over 10 per cent and exports by a remarkable 38 per cent.
>
> This Government has recognised that a key part of a viable, innovative telecommunications infrastructure is the capacity to design and build state of the art equipment."

[Extracts from an address by Senator Peter Cook, Minister for Industry, Science and Technology, at a seminar sponsored by the Australian Electrical and Electronics Manufacturers Association and the Australian Telecommunications Industry Association, Sydney, 12 February 1996]

An exhaustive list of radio amateurs who found motivation to enter a scientific or technological career stemming from their interest in amateur radio is too voluminous to reproduce here. Following are just a few pertinent examples which serve to demonstrate the thesis that amateur radio is not only of value to the community, but returns value to the community.

One of the recipients of the 1995 Australia Prize, our country's top science award, was Dr Ken McCracken VK2CAX. The Australia Prize is awarded to researchers who have made outstanding contributions to science and technology promoting human welfare. Gaining his amateur licence as a student, Dr McCracken went on to become the founding chief of the CSIRO's Division of Mineral Physics and the founder of the CSIRO's Office of Space Science Applications (COSSA). Dr McCracken shared the $300,000 prize with Dr Andrew Green and Dr Jonathan Huntington of the CSIRO

Division of Exploration and Mining, and Dr Richard Moore Emeritus Professor of Electrical and Computer Engineering at the University of Kansas, USA. In awarding the prize, Senator Peter Cook said Dr McCracken, Dr Green and Dr Huntington were an outstanding research team which had pioneered satellite-based remote sensing in Australia.

John Morgan BSc DipEd VK6NT is director of his own research and development company, J R Morgan and Associates Pty Ltd, of Perth. He and his company have been involved in designing computer control technology into airconditioning systems, manufactured in Perth by Cool Breeze Manufacturing and exported to South Africa and other countries. John Morgan has invented numerous innovative techniques and processes which made the products concerned superior to their competitors.

Grant Willis VK5ZWI, of Adelaide, began his interest in electronics through amateur television experiments, gaining his amateur radio licence aged 13. This interest continued through high school and tertiary education, leading to a Batchelor of Electronic and Electrical Engineering degree. He now works as a Radio System Engineer in the communications industry.

Dick Smith VK2DIK of Sydney. An interest in electronics as a youngster led to an amateur licence in his teens. He later opened a car radio service store and then a store in Atcheson St, St Leonards, selling electronic components and products. This he built into a vigorous, multi-million dollar chain of stores which, since the early 1980s, has been owned and operated by Woolworths. Dick Smith went on to head the *Civil Aviation Authority* and started the highly successful *Australian Geographic* magazine, recently sold to Fairfax. He is a noted adventurer, having circumnavigated the globe in his helicopter (now in the Power House Museum in Sydney) and flown across the Australian continent in a balloon (communications backup was amateur radio).

Mrs Florence (Violet) MacKenzie VK2GA/2FV of Sydney, was the first woman in Australia to take out an experimental wireless licence, in 1921, and to pass the amateur licence examination in 1925. She became an electrician by trade, and was the first woman in Australia to hold a Diploma in Electrical Engineering. At the outbreak of World War 2, she foresaw the importance communications would play and set up a school in Clarence St, Sydney, to teach men and women the Morse code, training thousands during that time. She was subsequently responsible for the foundation of the WRANS and was awarded an OBE for her service to Australia. There is a commemorative stained glass window to her in the RAN Chapel at Garden Island.

Literally, thousands of like examples can be quoted. It has been the same since amateur radio's "birth" at the turn of the century, and has continued through to the present era.

During 1995, attention was drawn by the media to an alarming decline of interest in science among school students. This attention resulted from a study published in January 1995 by Woolcott Research. The Woolcott Report highlighted not only this decline of interest in science among students, but also painted a gloomy picture about ignorance among middle managers about how to initiate and organise science and technology research projects. Public spending on scientific research in Australia is around the $1 billion level, but spending in the private sector is well behind Out of 24 OECD and Asian nations, Australia ranks 18th for investment in research and development. In January 1995, the Editor of *The Australian* warned:

> "There has to be a change in attitude inculcated at an early age so that science is seen as being as attractive as the law or medicine, subjects which many of our most capable

students favour because of the greater financial rewards. Bringing about this change will be an immense challenge for educators. It is something that needs to be woven into the fabric of the education system before any results will become apparent. It is also becoming an imperative for business."

From the foregoing evidence, the Amateur Radio Service in Australia has had a role to play in motivating young people to take up an interest in science and technology and continues to contribute to the community in this area, well recognised now as being important to Australia's future.

Contribution to the Advancement of Scientific Knowledge

In many ways over the decades, some small and some significant, Australian radio amateurs have contributed to the advancement of scientific knowledge. While many instances could be cited, presented here are a couple which exemplify this contribution to Australian radio amateurs.

During the mid-1960s, the Defence Science Research establishment in South Australia instituted a research project into anomalous high frequency (HF) and very high frequency (VHF) radio propagation across the equator (transequatorial propagation) between Japan and Australia. It was US and Australian amateurs who discovered and exploited this type of radio propagation just after World War 2. Many radio amateurs from around Australia contributed propagation reports to the project, following a public request from the project director. A number of research papers were published as a result and the amateur radio community's help acknowledged.

On 23 January 1970, the **fifth amateur radio satellite**, **OS-CAR 5**, was launched. This satellite, weighing 17.7 kg, was of considerable significance to Australia as it was entirely designed and constructed by a small group of radio amateurs at the University of Melbourne. The electronics aboard this satellite included two telemetry transmitters, an encoder and a telecommand system, enabling it to be controlled by amateur radio stations sending commands from the ground. One of the on-board experiments measured the satellite's temperature, to get a measure of the changes experienced during its orbit, the data being sent to ground stations via telemetry through an on-board amateur band transmitter. Significantly, this experiment revealed that the engineering formula previously used by space engineers to predict an orbiting satellite's temperature was in error.

Another transequatorial radio propagation research project was conducted in the early 1970s by the **Ionospheric Prediction Service** (IPS), then a Division of the Bureau of Meteorology (now IPS Radio and Space Services, a division of DAS). Following a public call for assistance with radio propagation reports from the amateur radio community, many radio amateurs provided information and the IPS subsequently published a research report, which has been cited in later research papers. The radio amateurs who contributed were acknowledged by the IPS.

Contribution to the Development of Technology

As a result of an interest in amateur radio, many Australian radio amateurs have made recognisable contributions to the development of electronics and radiocommunications technology

It should be recognised, at this point, that radio amateurs were the first community broadcasters, realising and exploiting the demand during the 1920s and 1930s, for entertainment which could be broadcast into the home. Point to point radio communications wasn't the only interest among radio

amateurs of the era. These early amateur radio broadcaster paved the way for Australia's vigorous broadcast industry and the local manufacturing which fed the demand (in which many early radio amateurs were also prominent)

■ **One of Australia's first radio amateurs**, Henry Sutton, licensed by the Commonwealth circa 1900, was a prolific inventor. Apparently a quick learner, he read science and engineering texts as a teenager and experimented with flying machines and an electric dynamo and motor. Apart from being credited with building a portable radio transceiver in 1900, he published in 1885 a method for transmitting pictures over a distance by wire, called the "Telephane" - a precursor to television. Sutton was also credited with having built Australia's first motor car.

■ A Melbourne radio amateur, the late **Alan H Reid VK3AHR**, took a degree in electrical engineering following an interest in amateur radio as a young man. He later devised a design for an instrument to detect the location of faults in overhead electricity transmission lines, saving electricity authorities a great deal of money in having repair teams patrol hundreds of kilometres of overhead lines to investigate faults. Called Fault Locator for Overhead Systems (affectionately referred to as "flossies"), its success rested on an electronic circuit which Alan Reid designed and patented. He manufactured the FLOSs in his Melbourne factory through the 1950s and 60s, and exported them all over the world, particularly to the USA, South Africa and the Middle East. Today, his business would be referred to as one of Australia's high-tech, "born global" small-medium enterprises, seen as heroes of our manufacturing industry.

■ The group of **Victorian radio amateurs** and Melbourne University students who designed and constructed the OS-CAR 5 satellite mentioned earlier, made a significant contribution to the technology of low earth orbiting (LEO) satellites which are now coming into prominence in global telecommunications. They devised a simple satellite stabilisation scheme involving on-board permanent magnets which reacted with the earth's magnetic field to stabilise and orient the satellite during orbit.

■ The renowned **pedal wireless was invented by a radio amateur**, Alf Traeger VK5AX. The pedal wireless became the backbone of John Flynn's Royal Flying Doctor Service, another Australian icon. Starting in amateur radio as a young man, Alf Traeger became an electrical engineer. George Towns and Harry Kauper attempted to build an experimental radio transceiver for John Flynn, meeting with limited success. Kauper introduced Flynn to Traeger in 1926 who set up successful experiments, the work undoubtedly being based on his amateur radio experience. His ingenuity led to the pedal generator to power the sets, which he improved and began manufacturing in late 1928. Further improvements followed and an outback radio network grew up with remote homestead stations around Australia. Out of this grew the "School of the Air" for children in isolated regions. Traeger's company became a well-known and respected name in the Australian communications manufacturing industry.

■ In the 1930s in NSW, a young man combined his trade in the fledgling photographic industry with his interest in electronics and amateur radio to develop a product which has become a cornerstone of the Australian racing industry. That young man was the late **Reg Brook VK2AI**, who devised the "photo finish" camera. A firm now operated by his son, still installs and services photo-finish cameras to this day.

■ **Australia's first television broadcasts** were made in Brisbane by **Thomas M B Elliott VK4CM**. Conducting experiments from 1927 until 1935, Elliott began regular daily broadcasts on 8 October 1935. The system employed a

mechanical scanning unit similar to that developed by TV pioneer John Logie Baird. The technology provided comparatively low definition pictures with an image rate of 12.5 pictures per second (half the rate of modern TV). The broadcasts were received in Melbourne, 1500 km away. A plaque on the Old Windmill Tower at Wickham Terrace in Brisbane, commemorates Elliott's achievements.

Providing Communications During Emergencies and Supporting Community Events

Post-WW2, the radio amateur fraternity has amassed a vehicle record of community assistance during disasters. Ranging from the mid-1950s floods in NSW, for example, through the devastating 1965 Victorian bushfires, to the Darwin Cyclone Tracy tragedy in 1974, the 1989 Newcastle Earthquake, Victorian floods in 1993 and NSW bushfires in 1994. These are but a few distinct examples among dozens of others all round the country, over the past 50 years. It should be noted, however, that the record extends back to the 1920s.

The United Nations has given formal recognition of the role and value amateur radio can have in emergency communications. In 1995, the Working Group on Emergency Telecommunications (WGET) of the UN Department of Humanitarian Affairs, in drafting recommendations for overcoming barriers to improving disaster communications, proposed one of the ways to overcome such barriers is to:

> ". . . encourage the development of the amateur radio services and their application to disaster communications."

Considering war as a community emergency, it is notable that more than 2000 radio amateurs served in the defence forces in World War 2, many entering signals and radar units during their service.

■ Official recognition of community assistance has often been generous in its praise. The then WIA NSW Division president, the late Jim Corbin then-VK2YC, received an MBE for his part in organising radio amateurs' communications support during the 1950s floods, although he always said it rightfully belonged to the WIA.

■ Radio amateurs' role in the 1975 Cyclone Tracy disaster at Darwin was praised in 1992 by the then Federal Minister for Communications, Mr Bedall, in a speech given on his behalf by MP Warren Snowden, broadcast nation-wide from Darwin in October that year. He said

> "The work carried out by Amateurs when Darwin was ravaged by a cyclone on Christmas Day in 1974 was outstanding.
> There was virtually a loss of total communications with the outside world. When telecommunications links were cut, nothing was heard from Darwin for a number of hours until the lone voice of a Darwin amateur made contact with other amateur operators
> The call was the first in a series of communications established by amateur operators throughout Australia and it wasn't long before a network of amateur stations was established (who) relayed traffic of a health and welfare nature while the rest of the country tried to re-establish communications and provide relief to the people of Darwin."

■ Following the "Ash Wednesday" bushfires which ripped through many communities in Victoria early in 1983, the then Federal Minister for Communications, Neil Brown, praised the work of WICEN and amateur radio operators.

> "Amateur radio operators had shown complete dedication to the best interests of the community in providing an emergency communications network in the fight against the Victorian bushfires.
> The operators gave generously of their expertise and without thought to the cost to themselves."

In that event, 160 members of WICEN swung into action with Victoria's SES using their own radio equipment and vehicles, and 150 extra members on standby.

The Minister, Mr Brown, said the Red Cross and St John's Ambulance had relied on the radio amateurs of WICEN for their communications.

■ Ten years later, the Victoria Police were fulsome in their praise of assistance from radio amateurs during the 1993 floods. Acting Chief Commissioner, Robert Falconer, said:

> "The effort by WICEN volunteers and the fact that they are volunteers who provide their own time and resources, is to be highly commended as in such circumstances it would have been extremely difficult to complete the registration of evacuees by any other method."

■ During the ferocious 1994 bushfires in many regions of NSW, hundreds of radio amateurs played critical roles in providing key communications links, particularly on the Central Coast, the Blue Mountains and around the northern suburbs of Sydney.

■ The state WICEN organisations provide communications support for community events around Australia. This provides valuable regular "exercise" in communication skills as well as experience with portable equipment.
- in NSW, some 30-plus events are supported each year, including cave rescue exercises, horse enduros, canoeing events, bicycle rides etc.
- in Victoria, WICEN supported three major community events in 1995, involving more than 50 members.
- in Western Australia, WICEN supported 13 events in 1995, involving 60 members who travelled a total 6088 km, contributing 6696 man-hours.

■ A popular, and well supported community event involving amateur radio is the annual world Jamboree of the Air (JOTA) for Scouts and Guides. Held over a weekend on October each year for almost 40 years now, more than 100 countries now participate, representing 98% of members of the World Organisation of Scout Movements.

In recent years, the number of Scouts and Guides participating around the world has reached 500,000, involving more than 33,000 radio amateurs.

In Australia, in recent years the number of radio amateurs participating is around 1400, operating nearly 700 individual stations. Some 16,000 Scouts and 8000 Guides, with about 2500 Scout Leaders and 1400 Guide Leaders participating. Scout and Guide participation has been increasing at the healthy rate of 9% in recent years. These young people are introduced to modern radio communications and the excitement of international amateur radio.

JOTA acts as a spark for many to attempt the various Scout and Guide technical badges in electricity and electronics, and some of these young people go on to get their amateur radio licence.

4.0 Radiocommunications Licensing Systems under the Radiocommunications Act 1992

The Radio Communications Act 1992 creates three licence systems for the purpose of managing access to, and the use of, the radiofrequency spectrum.

These are:

Apparatus Licensing,
Class Licensing, and
Spectrum Licensing.

Apparatus Licensing

This was the predominant form of radiocommunications licensing before the enactment of the Radiocommunications Act 1992. Previously, there were 94 transmitter and 16 receiver licence categories. Following the SMA's 1993-95 review of Apparatus Licensing, there are now 16 transmitter licence types and three receiver licence types.

Transmitter Types	Receiver Types
Aeronautical	Major Coast Receive
Aircraft	Earth Receive
Amateur	Fixed receive
Broadcasting	
Defence	
Earth	
Fixed	
Land Mobile	
Maritime Coast	
Maritime Ship	
Multipoint Distribution Station (MDS)	
Outpost	
Public Telecommunications Service	
Radiodetermination	
Scientific	
Space	

A clear definition of an Apparatus Licence is hard to come by. The Act, Part 3.3, Division 1 - Types of apparatus licences, says:

> (2) A transmitter licence authorises:
> (a) the person specified in the licence as the licensee; and
> (b) subject to Division 4, any person authorised by that person under section 114; to operate specified radiocommunications transmitters, or radiocommunications transmitters of a specified kind

Section 114 concerns authorisation of third party users to operate the equipment in the licensee's absence. In the case of radio amateurs, this is not permitted except to other licensed amateurs. The Act also provides for transfers of licences between parties, so that equipment may continue to be used under the licence when ownership passes from one party to another, for example.

The SMA explains the role and purpose of Apparatus Licensing as follows:

> "Apparatus Licensing . . . authorises the operation of radiocommunications equipment for a particular frequency, geographic location and use."
>
> [*Implementing Spectrum Licensing*, SMA Discussion Paper, February 1995]

From the list of Apparatus Licence types, it is clear that this licence system is principally suited to private sector and public sector business operations, as it focuses on equipment and its uses in terms of radiofrequency spectrum locations and geographic locations. It is widely used by commercial, military, academic and government services.

The radiofrequency spectrum is divided, by international and national agreement, into bands allocated for given uses. For Australia, this is set out in the Australian Radiofrequency Spectrum Plan (published by the SMA), based on general spectrum usage allocations determined by the International Telecommunications Union (ITU) for this region of the world (ITU Region 3). The specific use of these allocations for Australian radiocommunications services is determined by the SMA.

The Apparatus Licence fee framework instituted in 1995 reflects the above precepts. This framework was instituted following a public inquiry process conducted by the SMA over 1993-95. The radio amateurs' representative association, the Wireless Institute of Australia (WIA), some WIA state Divisions, and individual radio amateurs made submissions to the SMA during this inquiry. The SMA explains the new Apparatus Licence fee framework as follows:

> "The objectives in reforming apparatus licence fees were to provide for an efficient, equitable and transparent system of charging for the use of spectrum and SMA services. This is to be effected by a new pricing framework based on three components:
>
> i. a spectrum access tax, based on the location and amount of spectrum access;
> ii. a spectrum maintenance component; and
> iii. an administrative component.
>
> The spectrum access tax is a fee which generally applies to each access to the radiofrequency spectrum, a community resource. The tax is derived from a formula that takes account of the licensee's spectrum access, in terms of four parameters:
>
> i. spectrum location;
> ii. geographic location;
> iii. channel bandwidth; and
> iv. area of coverage.
>
> The tax varies according to these parameters: as the demand for the location (geographic and spectrum) increases, the tax increases; and as the amount of spectrum access increases, the tax increases."
>
> [RB 68A, *Apparatus Licence Fee Schedule*, SMA June 1995]

The Spectrum Access tax is calculated according to a formula which incorporates these five components. In economic terms, this formula values 'scarcity' and 'demand', and acts as "a rationing device". It is thus based on fundamental commercial concepts. In introducing the formula, the SMA said:

> "The concept of using spectrum access as the basis for licence fees exists, to some extent, in the current fee schedule and is applied in a number of other countries.
>
> "The same formula will be applied to all users. Weightings will be used to distinguish between different spectrum locations and geographic locations, and to take account of channel width and area covered. The weightings will be derived from the current demand patterns for spectrum so that fees will be higher for users in larger cities and for users of more popular spectrum bands. Also, the fees will increase as the amount of spectrum accessed increases."
>
> [*Inquiry into the Apparatus Licence System - A New Outlook*, SMA, February 1995]

The Spectrum Maintenance component is related to the Spectrum Access Tax, as follows:

> The spectrum maintenance component is designed to recover the indirect costs of SMA spectrum management activities such as international co-ordination, domestic planning, interference investigation and policy development. It is a fixed percentage of the spectrum access tax, at 30%.
>
> [RB 68A, *Apparatus Licence Fee Schedule*, SMA June 1995]

This fee framework for the Apparatus Licensing system has been severely distorted in the SMA's application of it to the Amateur Type licence.

This distortion arises because:
■ the amateur radio frequency allocations are spread throughout the spectrum from the medium frequencies (MF) through to the microwave extra high frequencies (EHF);
■ a proportion of the bands are "secondary" allocations in which radio amateurs share occupancy with primary users;
■ radio amateurs have the freedom and flexibility to move around the spectrum, from band to band and within their allocated bands;
■ radio amateurs are free to scale their band allocations and vary their equipment as they see fit, constrained in technical operation only by the relevant Technical Licence Specifications (TLS) issued by the SMA covering specified bands, transmission modes, bandwidths and powers, etc;
■ and radio amateurs are spread throughout Australia, in cities, in rural and remote regions, and they have the freedom and flexibility to move their stations from location to location.

These factors render the application of geographic location, channel bandwidth and area of coverage in the application of the Spectrum Access Tax formula to Amateur licences quite meaningless.

The Amateur Radio Service in Australia has a total of 38 blocks of spectrum between the medium frequencies and the extra high frequencies. Some blocks are contiguous, which results in a total of 23 Amateur bands through the spectrum. In the Australian Radiofrequency Spectrum Plan, the Amateur allocations are generally coincident with the ITU Amateur allocations for Region 3, which are also largely coincident with Amateur band allocations throughout the spectrum across the rest of the world (ITU Regions 1 and 2).

Total access for the Amateur Radio Service in Australia is just over 8% of allocated spectrum. This may seem a comparatively enormous amount, but a great deal of it is shared because many Amateur bands are allocated on a "secondary user" basis; that is, radio amateurs must avoid interference to and accept the possibility of interference from, primary users in that part of the spectrum. A number of the Amateur band allocations in the ultra high frequency (UHF) and super high frequency (SHF) portions of the spectrum are allocated by ITU agreement to the Amateur-Satellite service, and are thus shared on an international basis. Of the bands allocated to Australian radio amateurs, primary user status applies to only 1.75% of the allocated spectrum.

The Amateur Radio Service has access to so many segments of the spectrum so that the nature of radio amateurs' activities, according to the ITU definition of the service, is not fettered by constraints on access to spectrum. This arises from international recognition of the value of the Amateur Radio Service to the world community, affirmed and reaffirmed at ITU World Radio Conferences over decades.

When the SMA originally determined fees for Amateur licences, which they released in December 1994, the Spectrum Access Tax component was $35 of the $69 fee (for an Unrestricted licence). They said that the figure was arrived at by taking into account all the primary Amateur bands and applied nation-wide, divided by the total number of amateurs.

The distortion of the Apparatus Licence fee framework was further compounded when the eventual fee of $51 was struck in March 1995.

Further, the Act allows for transfer of Apparatus Licences between parties by a simple administrative means. Amateur Radio licences are prohibited from being transferred in this way because the individual radio amateur is licensed according to a qualification held (the Amateur Operators Certificate of Proficiency).

A radio amateur's licence is identified by the call sign allocated by the SMA. Call signs cannot be transferred between amateurs without it being relinquished by the holder. A radio amateur cannot give or assign their licence to another person to use. A complication arises also, in that an amateur may apply to hold more than one licence-and-call sign. Some amateurs do hold multiple licences. Amateurs exchange transmitting and receiving equipment with each other, but the licence does not go with it.

Clearly this factor in the Apparatus Licensing model has distinct limitations for the Amateur Radio Service. Radio amateurs do not want the ability to transfer licences in the way conferred by the Act. It has chaotic implications for the orderly regulation of the Amateur Radio Service.

The actual model for amateur radio operations is distinctly at variance with the core precepts of the Apparatus Licensing system. As a consequence, the Apparatus Licensing system does not suit the Amateur Radio Service in Australia.

Class Licensing

This licensing system was introduced with the new Act in 1992. The SMA defines Class Licensing as follows:

> "A class license authorises any person to operate radiocommunications devices of specified kinds and/or for a specified purpose, provided the operation is in accordance with the conditions of the licence. They are used where individual frequency assignments are not required
>
> "The SMA does not issue class licences to individual users."
>
> [*Inquiry into the Apparatus Licence System*, SMA Discussion Paper, December 1993]

It is quite clear from this definition that Class Licensing is not a suitable licensing system for the Amateur Radio Service in Australia.

Radio amateurs require the freedom to operate equipment of their own choosing and/or their own manufacture

Radio amateurs require individual licences. This is a fundamental consequence of the ITU definition of the Amateur Radio Service. Australian radio amateurs would likely not be recognised by the members of the International Amateur Radio Union if the Amateur Radio Service in Australia oper-

ated under a Class Licence and Australian radio amateurs did not have individual licences.

Spectrum Licensing

This is also a new licensing system, introduced with the new Act in 1992. The SMA defines Spectrum Licensing as follows:

> "A spectrum licence authorises the licensee to operate radio-communications equipment within core conditions (frequency and geographic boundaries, and emission limits beyond those boundaries), subject to certain other conditions. A spectrum licensee can vary the use and technical operating arrangements within the emission limits, and assign the licence in whole or in part to a third part through trading or subleasing. Spectrum licences may be issued only in spectrum bands designated by the Minister."
>
> [*Inquiry into the Apparatus Licence System*, SMA Discussion Paper, December 1993]

A Spectrum Licence confers considerable flexibility of operation on the licence holder.

> "Spectrum licensing, instead of focusing on *equipment* and its uses (which in turn defines the area covered and the frequency bandwidth used), authorises the use of *spectrum* within specified limits of frequency bandwidth and coverage area. Under spectrum licensing, licensees will have the flexibility to change their equipment, antenna, siting, in fact any aspect of their use of spectrum, provided they comply with the core technical conditions of their licence, and any coordination requirements."
>
> [*Implementing Spectrum Licensing*, SMA Discussion Paper, February 1995]

This sounds like almost an ideal prescription for amateur radio operations, because it allows the flexibility required by the Amateur Radio Service, but the difficulty arises as to who would be the licensee. Would there be one licensee, who would then have responsibility to regulate operations within the allocated spectrum, or would all Australian radio amateurs hold the spectrum licence jointly and severally? Radio amateurs require individual licences. As noted previously, this is a fundamental consequence of the ITU definition of the Amateur Radio Service.

Because some Amateur frequency bands are allocated on a primary use basis and others are shared by radio amateurs with primary users from other radiocommunications services (e.g. defence, broadcasting), this mixed primary/secondary status creates administrative difficulties if radio amateurs were Spectrum Licensed.

In addition, a clear purpose of Spectrum Licensing is the ability to assign, trade or sublease the licensed spectrum, in whole or in part, granting rights analogous to property rights in the radiofrequency spectrum.

> "A spectrum licence provides the licensee something like a property right, where the licensee can trade and subdivide the spectrum to other users."
>
> [Speech to the *Wireless Technology Forum*, Sydney, 15 February 1996, by the Spectrum Manager, Christine Goode]

Spectrum Licensing has a clear commercial purpose. This is borne out by the fact that Spectrum Licences for bands of frequencies designated for Spectrum Licensing will be auctioned by the SMA.

The Government's policy framework relating to charges to be levied for Spectrum Licences provides that:

> • new spectrum licences will generally be allocated by a price-based allocation system which recovers the scarcity value of the spectrum;
> • all spectrum licensees will also be required to pay a separate annual fee related to the costs of administration of spectrum management; and
> • the SMA will be able to reserve spectrum licences for direct sale to public and community service providers, in some cases at concessional rates."
>
> [*Implementing Spectrum Licensing*, SMA Discussion Paper, February 1995]

Clearly, Spectrum Licensing is a framework for "spectrum for sale" in a like manner to real estate. However, a Spectrum Licence is more akin to a leasehold rather than a freehold title, because it has a limited tenure without presumption of renewal.

> "The Act provides that a spectrum licence may be issued for a period of up to 10 years, but there will be no automatic right for a person to be issued a second spectrum licence after the expiration of their first."
>
> [*Implementing Spectrum Licensing*, SMA Discussion Paper, February 1995]

However, the Act provides a mechanism for renewal, but with a "public interest" test.

> "The Act provides that the SMA may re-issue a spectrum licence to the original licensee without following the re-allocation procedures which would normally apply *if that would be in the public interest.*
>
> "The "public interest" in this case is able to be determined by the Minister, but any determination by the Minister is a disallowable instrument, able to be disallowed by either the House of Representatives or the Senate during the 15 sitting days after tabling.
>
> "The SMA expects that only very few situations will actually meet public interest criteria, for example, volunteer community or public services."
>
> [*Implementing Spectrum Licensing*, SMA Discussion Paper, February 1995]

Clearly, this mechanism has a deal of uncertainty associated with it. Radio amateurs want the certainty of continued access to their allocated spectrum and the renewal of their licences from period to period, so this aspect of the Spectrum Licensing system is anathema to radio amateurs.

It is clear the role of Spectrum Licensing and the requirements of the Amateur Radio Service, while having some congruence, have fundamental differences and Spectrum Licensing is not a suitable licensing system for the Amateur Radio Service in Australia.

5.0 Towards a New Amateur Radio Licensing System

Amateur Radio Activities and the Licensing Systems

Radio amateurs *operate* radiocommunications *stations* comprising equipment which may be:

■ designed and constructed by themselves;

■ assembled from units of commercially manufactured equipment originally designed for civilian, government or military applications, and adapted or modified for amateur radio pursuits;

■ assembled from commercially manufactured equipment designed for the world amateur radio market; or

■ a variety of combinations and permutations of the above.

Radio amateurs operate their stations on bands allocated under the *Australian Radiofrequency Spectrum Plan* (published by the SMA). These bands range from the medium frequencies (MF) through to the microwave extra high frequencies (EHF). Radio amateurs operate within the specified limits of these bands and are only constrained in technical operation by the relevant Technical Licence Specifications (TLS) covering specified bands, transmission modes, bandwidths and powers, etc. Radio amateurs have total flexibility to change their equipment, transmission modes, location and antennas, provided they comply with the core technical conditions of their licence, and any coordination requirements. This flexibility is essential to maintaining technical experimentation as one of the core activities and attractions of amateur radio.

By the very nature of radio amateurs' activities, the equipment used changes as the interests, pursuits and goals of the individual amateur changes.

Among all the defined radiocommunications services, amateur station operation is *unique*.

As has been demonstrated earlier, Apparatus Licensing is a poor licensing model for amateur radio activities because it is prescriptive, as it

> "authorises the operation of radiocommunications equipment for a particular frequency, geographic location and use."
>
> [*Implementing Spectrum Licensing*, SMA Discussion Paper, February 1996]

Apparatus Licensing is particularly suited to, and widely used by, commercial, military, academic and government services.

Likewise, it has been demonstrated that Class Licensing is not suitable for general licensing of amateur radio operators as it authorises the operation of

> ". . . radiocommunications devices of specified kinds and/or for a specified purpose . . . The SMA does not issue class licences to individual users."
>
> [*Inquiry into the Apparatus Licence System*, SMA Discussion Paper, December 1993]

Similarly, Spectrum Licensing has limitations for general licensing of radio amateurs, as many amateur radio frequency bands are shared with primary users, while radio amateurs have primary occupancy on many other bands. In addition, the 10-year tenure of a Spectrum Licence, without presumption of renewal, does not suit the reason-for-being and activities of the Amateur Radio Service.

Radio amateurs have always been licensed as *individuals*.

The Present Amateur Licensing System

Amateur radio operators are presently licensed under the Apparatus Licensing system. The licence type is categorised as **Amateur**, under which there are seven sub-types, as follows:

Unrestricted	Intermediate	Limited
Novice	Novice Limited	
Amateur Beacon	Amateur Repeater	

The last two sub-types are unattended stations operated by licensed individuals or special interest groups for the benefit of other radio amateurs.

A person wishing to gain an amateur radio licence has to sit for a publicly conducted examination, comprising modules of theory, regulations and/or Morse code operation, depending on the licence sub-type desired. The system is illustrated in Appendix LS1, *The Amateur Licensing System*. Candidates sit for multiple choice theory and regulations papers, and for practical sending and receiving tests in Morse code. The pass mark in the theory and regulations papers is 70%.

The amateur radio community's peak body, the Wireless Institute of Australia (WIA), has conducted the nationwide amateur examination service on behalf of the Spectrum Management Agency (SMA), operating under a Memorandum of Agreement, since 1992 when the WIA devolved the examination routine to the WIA. This service is formally known as the *WIA Exam Service*. Accredited invigilators supervise candidates sitting for the amateur licence examinations. The WIA has drafted examination syllabuses and questions banks and negotiated approval with the SMA. So, all the routine aspects of administering the amateur exam system are conducted by the WIA.

Upon receiving notification of the necessary pass mark in the required examination modules, a candidate applies to the Spectrum Management Agency for them to issue the necessary Certificate of Proficiency. This Certificate is issued to the individual and is unique to that person, just as is a Higher School Certificate. The SMA assigns the candidate a Customer Number. Again, this is unique to the individual.

Upon receipt of an Amateur Certificate of Proficiency, the candidate applies for a licence and call sign. The licence is renewable at annual or 5-yearly intervals. The original call sign may be held by the individual for many years, or changed because they move interstate, or for other reasons.

When a licensee holding other than an Unrestricted (full) licence passes the necessary additional examinations, they apply afresh for the appropriate Certificate of Proficiency, and a new licence and call sign — the call sign suffix identifies what licence grade is held by the licensee.

When licensees move from one state to another, they change their call sign to coincide with the new state or territory as the third character in the call sign is a number which identifies the geographic region of the licensee (1 = ACT, 2 = NSW, 3 = Victoria, etc). More than one call sign may be held by an individual licensee. Some licensees retain previously-held call signs. Some licensees will hold the same call sign all their life, some may have only two or three call signs throughout their life, while some may hold a series of perhaps five or more over a period.

A radio amateur's Certificate of Proficiency is held for life (even if their licence lapses through non-renewal, is relinquished, is suspended or revoked by the SMA), but a call sign may be taken up and relinquished or changed as the licensee sees fit.

Amateur Licence Fees

Under Apparatus Licensing, amateur radio operators are currently charged a fee comprised of three components,

identified on the licence and "Offer to Renew" as:

1/ A *Spectrum Access Tax* of $10;

2/ A *Spectrum Management* (previously, 'maintenance') *Component* of $3; and

3/ An *Administrative Charge* of $38.

At a meeting between the Spectrum Management Agency and the Wireless Institute of Australia on 5 December 1994, the SMA told the WIA that, on average, licensees retain a call sign for 10 years and that it cost the SMA $140 to issue an original licence (which presumably includes the cost of issuing the Certificate of Proficiency), and $11 for each renewal. The SMA said that amortising the costs over the average 10 years amateurs hold a call sign, yielded an administrative cost of $25 per annual renewal, which was set as the proposed Administrative Charge.

In early 1995, the amateur licence fee was $37, and the SMA proposed to raise it to $71 under the new Apparatus Licence fees regime.

Following protest from the amateur radio community, the Parliamentary Secretary to the Minister for Communications and the Arts, Paul Elliott, announced in March 1995, a reduction of the proposed $71 fee to $51.

The Administrative Charge component of the newly-struck fee rose from the previously determined $25 to $38; the rest of the $51 fee being made up of a $10 Spectrum Maintenance charge and a $3 Spectrum Access tax.

The $13 rise in the Administrative Charge, between December 1994 and March 1995, has never been explained.

As part of the 1993-94 review of Apparatus Licensing, the SMA determined a formula by which it could charge licensees for access to the radio spectrum.

> "The spectrum access tax is a fee which generally applies to each access to the radiofrequency spectrum, a community resource. The tax is derived from a formula that takes account of the licensee's spectrum access, in terms of four parameters:
> i.   spectrum location;
> ii.   geographic location;
> iii.   channel bandwidth; and
> iv.   area of coverage.
> The tax varies according to these parameters: as the demand for the location (geographic and spectrum) increases, the tax increases; and as the amount of spectrum access increases, the tax increases."
>
> [RB 68A, *Apparatus Licence Fee Schedule*, SMA June 1995]

It is obvious therefore, that in arriving at the $51 Amateur Licence fee, the SMA abandoned application of this formula in respect of the Spectrum Access tax component. Radio amateurs operate in defined frequency bands and have the flexibility to, at will, use transmissions of differing bandwidth, transmit on different frequencies within their assigned bands (many of which are shared with other primary users or shared internationally), and to change their location.

Hence, it is a practical impossibility to apply the Apparatus Licensing system's Spectrum Access Tax formula to amateur operations.

It can only be concluded that the originally proposed fee and the eventual fee of $51 were arrived at on the basis of "what the market could bear" and took no account of the substantial differences between the circumstances which pertain to private sector licensees, where licence fees are supported out of commercial income and the cost is passed on to

business customers, and the circumstances of public sector licensees where licence fees are supported by public revenue.

In the case of radio amateurs, their licence fees are paid out of private income, and is a recurrent expenditure. As a consequence of the ITU definition of the Amateur Radio Service, radio amateurs cannot have a pecuniary interest in their pursuits and thus licence fees must be paid from their private income. From WIA membership statistics, it is estimated that between one-fifth and one-quarter of Australia's radio amateurs are either students, retirees or pensioners, on restricted incomes. The WIA scale of membership fees reflects this fact, with reduced payments available to members in these circumstances. But it must be acknowledged that radio amateurs who are students or pensioners also make their collective contribution in being of value to the community.

The Amateur Radio Service in Australia would be better served by a new licensing system which arrived at a licence fee regime that was truly transparent, equitable for all licensees and reflected the value to the community of the Amateur Radio Service.

**Proposal for a New Licence
- the Amateur Operator Licence**

It is proposed that a fourth licence system be created under the Radiocommunications Act, to be called the **Amateur Operator Licence.**

The Amateur Operator Licence would recognise the complete flexibility amateur radio operators have in pursuing their activities, within the framework of the allocated amateur frequency bands, the Technical Licence Specifications and the Radiocommunications Act. The present seven licence sub-types would be removed.

It is proposed that a licence fee be retained, because some 'engagement' between the amateur radio community and the SMA must necessarily remain to meet obligations under the ITU Radio Regulations and the Radiocommunications Act.

The new Amateur licence fee would be made up of two components: a *Spectrum Management* component, and an *Administrative Charge.*

Access to radio spectrum for radio amateurs is defined by the allocated bands according to the Australian Radiofrequency Spectrum Plan (published by the SMA).

The fee would not include a *Spectrum Access Tax* component, for all sub-types of Amateur licence, in recognition of the value of amateur radio to the community, and the value amateur radio operators and their activities return to the community.

The nett cost in loss of revenue would amount to less than $200,000 in 1996 terms.

The *Spectrum Management* charge is proposed to be retained at the present level of $3 as it is clear that the SMA determined in 1995 that this satisfies their administrative requirements.

The *Administrative Charge* would be reduced by reducing amateur radio operators' engagement with the Spectrum Management Agency.

The cost of public administration of the Amateur Radio Service in Australia has previously been reduced through devolvement of the amateur licence examination system to the WIA. This is the key part of licensing amateur radio operators: establishing candidates' competency in technical and regulatory matters to meet agreed standards.

The principle of devolvement of administrative routines could also be applied to the issuing of call signs, reducing individual amateur radio operators' engagement with the SMA, thus achieving further savings in administrative burden and cost.

It is envisaged that, eventually, the issuing of Certificates of Proficiency could also be devolved to the WIA Exam Service with a consequent reduction in administrative cost.

It is recognised that the Spectrum Management Agency has statutory obligations under the Radiocommunications Act in respect of regulating the Amateur Radio Service in Australia.

It is also recognised that the Government has determined that:

> "The SMA will operate on a full cost recovery basis. It will charge users for services and facilities provided to them."
>
> [*Inquiry into the Apparatus Licence System*, SMA Discussion Paper, December 1993]

With the above in mind, it is proposed that new administrative arrangements be instituted which would reduce the administrative burden and thus the cost.

Amateur radio operators' contact with the Spectrum Management Agency is labour intensive for the SMA in the initial phase of licensing — the issuing of a Certificate of Proficiency, licence-and-call sign.

After that initial phase, contact between amateur radio operators and the SMA involves:

    (i) licence renewal (annually, 5-yearly, or annual instalments of 5-year renewal);

    (ii) licence upgrade with new Certificate of Proficiency and new licence-and-call sign;

    (iii) change of call sign/additional call sign(s).

Item (i) is predominantly an automated operation and comparatively low in cost. Item (ii) is as labour intensive as the initial phase of licensing. Item (iii) is intermediate in labour and cost.

In principle, the amateur licence and the call sign are separate entities and the issuing of each could be administratively separated. The amateur licence could still be issued by the SMA, while the issuing and administration of amateur call signs would be devolved to the WIA.

It is proposed that the Administrative Charge for an Amateur Operator Licence could be reduced in the following way:

■ Candidates who have met the necessary examination requirements be issued with an Amateur Operator Licence by the SMA for a 5-year term; the existing arrangements in respect to licence renewal, and regarding licence suspension or revocation following a breach, would be retained.

■ At the time of licensing, the SMA issues a candidate with an individual Client Number, as is the present case. Licensed radio amateurs, as clients of the SMA, would still have the responsibility of notifying change of station, etc, address to the SMA.

■ Candidates are not issued a call sign by the SMA at the time of licensing; this would be devolved to the amateur radio community's peak body, the Wireless Institute of Australia, under a Memorandum of Agreement between the SMA and the WIA.

■ The WIA would administer all aspects of issuing call signs. New call signs issued to, and call signs relinquished by licensees would be recorded by the WIA and supplied to the SMA at agreed intervals (e.g. quarterly) so that Amateur Operator details for the SMA database are recorded as whole groups (*en bloc*), rather than one after another (in *seriatim*) "on demand", as is the present case. This affords efficiencies not otherwise available in the recording of call signs and

maintenance of the licensee and call sign database, which is intensive in terms of staff labour and computer resources.

The Amateur Operator Licence Proposal in Summary

That a new licence system be created, in addition to the current three systems, to be called the Amateur Operator Licence system. The present seven licence sub-types would remain.

That persons wanting to be amateur radio operators obtain the relevant qualification for an Amateur Operators Certificate of Proficiency through the present amateur examination system.

That no Spectrum Access Tax be levied, in recognition of the value of amateur radio to the community, and the value amateur radio operators and their activities return to the community.

That the Amateur licence fee comprise just two components:
    • a Spectrum Management charge, and
    • an Administrative Charge;
the Spectrum Management Charge to be maintained at the present level of $3, and that SMA administrative costs be reduced by devolving the routine administration of amateur call signs to the WIA.
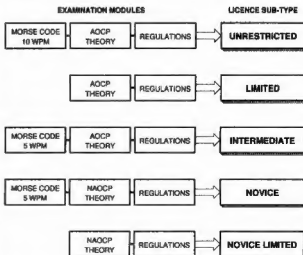

A framework for introducing the Amateur Operator Licence might proceed as follows:

1/ The SMA to make immediate arrangements to devolve the administration of amateur call signs to the WIA;

2/ Concurrently, the SMA develops the necessary new administrative procedures;

3/ Concurrently, the SMA institutes recommendations for pertinent changes to the Radiocommunications Act.

4/ The proposed amendments are introduced to the 38th Parliament.

        ooo000ooo

THE AMATEUR LICENSING SYSTEM   **APPENDIX LS1**

EXAMINATION MODULES			LICENCE SUB-TYPE
MORSE CODE 10 WPM	AOCP THEORY	REGULATIONS	UNRESTRICTED
	AOCP THEORY	REGULATIONS	LIMITED
MORSE CODE 5 WPM	AOCP THEORY	REGULATIONS	INTERMEDIATE
MORSE CODE 5 WPM	NAOCP THEORY	REGULATIONS	NOVICE
	NAOCP THEORY	REGULATIONS	NOVICE LIMITED

AOCP = Amateur Operators Certificate of Proficiency
NAOCP = Novice Amateur Operators Certificate of Proficiency
WPM = words per minute